CHEETAL

PEACOCK ON ANTHILL —by M. Janardhanan

The Wildlife Preservation Society of India

PLENTY THROUGH PRESERVATION

Vol. 29 No. 1

CONTENTS

		Page
1.	Loss of Forest in Nepal on Indo-Nepal Border, A Case of Grave Concern for The Ecosystem Management in India by N.K. Sinha ...	1
2.	Bird Survey of The Melghat Tiger Reserve by V.B. Sawarkar ...	4
3.	The Pench Bison—An Ecological and Behavioural Stuby by G.D. Dwivedi and Rakesh Shukla	28
4.	Tracking Wildlife The Easy Way by S.M. Osman and V.K. Verma ...	32
5.	Wildlife Legacy of India	36
6.	A Check List of Fishes of Rewa District, Madhya Pradesh (India) by Rajendra M. Saxena	40
7.	Martyrdom, But of a Different Class by Air Commodore R.S. Bishnoi, A.V.S.M. (Retd.)	51
8.	Behaviour and Breeding Biology of Pied Myhna *(Sturnus contra contra)* and Common Myhna *(Acridotheres tristis tristis)* by J.H. Desai and A.K. Malhotra	54

CHEETAL

Journal of the Wildlife Preservation Society of India

Vol. XXIX | Jan. 1988, Dehra Dun | No. 1

Loss of Forest in Nepal on Indo-Nepal Border, A Case of Grave Concern for The Ecosystem Management in India

By

N.K. Sinha

The dependence of human beings on forests and forest products is immense. The rural human population living in the forest and surrounding areas are mostly tribals and are generally poor. The forest and its pastures provide them food, fuel, building material such as wood and grasses for roofing and grazing grounds for their livestock. The local human population also subsists by exploiting the forest produce such as fruits, honey, leaves used for making bowls and plates, and for use in selling consumer goods such as meat, fish etc. in the cities.

The Terai region of Uttar Pradesh, bordering Nepal, and the adjoining areas of Nepal were known for thick moist tropical deciduous forest. The transient fauna and flora are being exploited by the local population living inside these forests and at the periphery.

It seems that due to shift in the policies of administration of Nepal, the forests along the Indian border in southern Nepal are being cleared and human settlements are coming all along the Indian border. The author visited the northern border areas of Bahraich district of Uttar Pradesh Terai which is contiguous with Nepal approximately between Lat. 27°50′ to 28°30′ North and between Long. 81°10′ to 82°07′ East, in recent years and in particular in 1985 and 1986. It has been observed that a large chunk of forest is being cleared just on the Indian border and new human settlements in the form of

villages are coming up in Nepal along the Indian border opposite Bahraich district. It seems that the inhabitants of these villages are not local population but are brought from distant areas. However, the Indian side of Indo-Nepal border is having the usual natural forest and no damage has been done to it by the Indian authorities, whereas the Nepal settlers exploit our forest wealth for their daily needs. This has created an immense problem for the managers of forests on our side of forest on the international boundary.

The extension of cultivation and spreading of villages right up to the forest edge has created an allurement to the wild herbivores for the green crop fields and carnivores to the livestock and poultry. This has resulted in the confrontation between conservationists and agriculturists which ultimately result in trapping and killing of our precious wildlife which ventures outside the Indian boundary and also increase the incident of poaching and theft of forest products in our forested areas. As the crime is either being done in another country or the culprits after committing the crime on Indian side cross over the international boundary, where they have their own laws and our wildlife rules do not apply, the culprits go scot free after committing the crime.

In earlier days, there used to be wasteland or marginal land at the end of forest and this land in between villages and forest was left as pastures for cattle grazing, fire control and preventing wildlife coming in direct contact with the villages. These wastelands provided substantial supplement to the wildlife habitat in the adjoining forests. But due to the expansion of new human settlements right up to the edge of the forest has resulted in the loss of these marginal lands which were working as a buffer zone and have affected the past management practice and the efficacy of both grazing and fire control.

A look at the problem from close angle reveals that the population living around the forest do not destroy the forest and its produce for sheer greed, ignorance or irresponsibility. Rather it is from their desperation, compulsion and poverty. However, large scale destruction takes place due to the excess human interference in the natural balance and ecosystem of the area. The village folk living close to the forest usually stripe the land of grasses, shrubs and trees and overgraze the pastures. They also overhunt the wildlife and overfish the water bodies for meeting the needs of their food, fuel and shelter. As a result of overexploitation, the environment gets affected and the niches of various ecosystem necessary for survival are strained. These changes impair the ecological process and destroy the genetic resources. The various constituents of the ecosystem such as vegetation, habitat, wildlife environment and human Influence get affected by an imbalanced exploitation. The changes in the ecology is affecting certain species communities who have requisite habitat attributes needed for the ecosystem. These

attributes may be dispersed through the area sectorally or interspersed often because of unsurmountable difficulties due to overexploitation of the area.

Every species has a fixed place in the ecological chain. The habit of every faunal species has certain sociological requirements such as association of flocks and herds and their territorial requirements. These requirements are decided by the evolutionary history of the species. The habits of the species are fixed and any change in the habitat or ecological niche is detrimental and is bound to affect the overall survival of that particular species. Plants and their association form the most extensive wildlife habitat. Faunal and floral communities in an ecosystem shape its natural systems through predictably serial succession and thus change their total habitat. This integrated habitat changes with natural succession till final equilibrium stage is reached. It is also known as climatic climax. Human interference may retard, hasten or arrest the process in an unpredictable way. Regression leading to the impoverishment of species starts with indiscreet over use of habitat.

Due to clearing of tree cover, vegetational regression detrimental to wildlife takes place in the forest. This results in heavy grazing and uncontrolled summer fires which lead to regression of water table. The main feature of such regression affect the plant association and result in replacement of grass, fodder plants and lower rate of tree regeneration inside adjoining forested areas because of uncontrolled growth of annual and perennial weeds. The macro and micro fauna also gets affected and the whole food chain of a variety of animal species gets disturbed.

As the situation exists on our border in Bahraich district, it is essential to have a firm management strategy to combat adverse impact of forest loss in adjoining Nepal so that the pressure on our forest may be reduced. This may be achieved by taking effective steps to control the forest thieves and their cattle etc. into entering our forested land. For this purpose, it is suggested that a barbed wire fencing may be erected along our forest on the boundary. If this is not possible then the other measures required to be adopted are development of effective machinery for catching cattle and human beings using nefareous activities in our forests and intensive petrolling on the border areas by the forest personnels. For this purpose the strength of forest staff may be increased.

Acknowledgements

The author is grateful to Dr. Raj Tilak, Deputy Director, Zoological Survey of India, Dehra Dun for encouragements and facilities and for kindly critically going through the manuscript and to the Director, Zoological Survey of India, Calcutta for facilities in various ways.

Bird Survey of The Melghat Tiger Reserve

By
V.B. Sawarkar

Wildlife Institute of India, Dehra Dun

Introduction

The forests of Melghat are acknowledged among the finest teak producing tracts in Maharashtra and equally valued for their wildlife resource. Historically known for tiger, sloth bear, gaur and sambar, approximately one half of these forests (1571.74 square km) were included for management under Project Tiger in the year 1974. Situated within the Satpura trend, the Gavilgarh range of hills forming the Tiger Reserve fall between latitudes 21.15°N and 21.45°N and longitudes 76.57°E and 77.30°E (Shaikh & Sawarkar 1973). Between the years 1973 to 1979 observations on occurrence of various species of birds within the reserve were recorded. The survey established occurrence of 243 species of birds belonging to 146 genera and 48 families. The earliest documented account of birds in Melghat dates back to 1942 and mentions 54 species (Wright 1942). This survey was for the Berar area and not specifically for Melghat which was only a small portion of it.

The Habitat

As per the Revised Classification of Forest Types by Champion and Seth (1968), the forests are represented by Group 5, Sub-Group 5A, the Southern Tropical Dry Deciduous Forests. The main geological formation is Deccan Trap. Altitude varies from 300 m to 900 m above MSL in an extremely hilly tract.

The forests are recognised into three local sub-types (i) the teak forests *(Tectona grandis)* cover the major portion of the reserve with *Terminalia tomentosa* and *Anogeisus latifolia* as chief associates. Bamboo *(Dendrocalamus strictus)* is associated with teak over large areas. *Lantana camara* forms a dense undergrowth, chiefly along moisture localities where bamboo and gasses are absent. (ii) Tiwas *(Ougenia oogeinensis)* forests occur on higher slopes and plateaux. Woodland density is sparse with interspersed grassy patches. (iii) Mixed forests also occur along higher slopes with high woodland density. (iv) Salai *(Boswellia serrata)* forests mainly occur in the southwestern portion, where soils are shallow. Ths forests are open with grassy blanks.

The reserve has a core area of 301 square km free of all resource use practices with a buffer of 1270.74 km square of Reserved Forests, approximately 4/5th of which are worked under the Selection System and the rest under Coppice with Reserves. Small size teak plantations of various ages are scattered randomly (Joshi 1973). Within the diverse

forest habitats occur 54 small villages with their agricultural areas (mean area 2.77 square km) all located within the buffer. In addition there are six deserted villages.

The reserve forms a watershed of the river Tapti along its northern boundary. The annual rainfall varies from 1000 mm to 2250 mm. However water retention is poor in the Trap formation. Consequently none of the five rivers within the reserve along with their numerous tributaries carry perennial flow of water. In summer water is found in rocky depressions, in some springs, seeps and in acquifers chiefly in the riparian areas. Water sources are unevenly distributed. There are four tanks and several anicuts within the reserve. Management lays emphasis on development and maintenance of water sources. The 'dryness' is increasingly apparent from the month of March and onwards till the monsoons break over Melghat.

The overall habitat diversity,— the combination of inherent diversity and that induced by management is high (Saharia and Sawarkar 1982, Sawarkar 1984).

The Survey

(i) *Identification*

Over the six year period, observations on occurrence of species of birds were recorded during field visits (i) by sighting, using an 8×40 pair of binoculars (ii) by calls. This was especially important in case of birds not easily seen or those difficult to identify even when seen, e.g. cuckoos, owls, nightjars etc. More observation time was used for small birds with characters not easily resolved e.g. Warblers. The ten volumes— Handbook of the Birds of India and Pakistan, now a compact edition (Ali & Ripley 1983) were used as standard reference.

(ii) *Status*

Status includes (a) abundance (b) seasonality of occurrence.

(a) Abundance— The judgement is entirely subjective and is based on 'commonness' of occurrence by sighting or by calls. Thus a descending scale of adundance— abundant, common, not common and occasional is used, denoted by A, C, NC and O respectively in the list to follow.

(b) Seasonality of occurrence— It is based chiefly on observations on a species for its year round presence. Thus a scale of 'residency' was followed: resident, local migrant, winter visitor and summer visitor denoted by R, M, W and S respectively in the list to follow. The 'M' status was accorded with reference to notes on 'abundance' within Melghat. If a year round present species obviously appeared to decline in abundance seasonally it was categorised as a local migrant. Such pattern over the observation period was considered for the purpose.

RESULT

The species are arranged by families and genus in the sequence according to Ripley (1982), Ali and Ripley (1983). Below the English and Latin names reference to the position in Fauna of British India—Birds, E.C. Stuart Baker, 1922-30 (FBI) and in the Handbook of the Birds of India and Pakistan, Ali and Ripley, 1983 (BIP) is provided. A reference at the sub-species level is included in parenthesis on the basis of reported range of the sub-species. This is not identification at sub-species level. It is acknowledged that even such references are not complete since all the reported sympatric sub-species have not been considered. In few cases it was not possible to confirm a species e.g. Pintail snipe or Fantail Snipe or both ?

Such entries with doubts about identification carry a sign of interrogation. The list of species follows.

PODICIPEDIDAE

1. Little Grebe — *Podiceps ruficollis (capensis)* Salvadori
   FBI 2292,6(481) — BIP 5, 1(6) M, NC

ARDEIDAE

2. Grey Heron — *Ardea cinerea (rectirostris)* Gould
   FBI 2218, 6(340) — BIP 36, 1(55) R?, NC
3. Indian Pond Heron — *Ardeola grayii (grayii)* (Sykes)
   FBI 2229, 6(364) — BIP 42, 1(63) R, C
4. Cattle Egret — *Bubulcus ibis (coromandus) (Boddaert)*
   FBI 2226, 6(349) — BIP 44, 1(66) R, C
5. Large Egret — *Egretta alba (modesta)* JE Gray
   FBI 2223, 6(346) — BIP 46, 1(69) M, NC
6. Smaller or Median Egret — *Egretta intermedia (intermedia)* (Wagler)
   FBI 2224, 6(347) — BIP 47, 1(69) M, NC
7. Little Egret — *Egretta garzetta (garzetta)* (Linne)
   FBI 2225,6(348) — BIP 49, 1(72) R, C
8. Chestnut Bittern — *Ixobrychus cinnamomeus* (Gmelin)
   FBI 2238,6(367) — BIP 56, 1(84) M, NC
9. Yellow Bittern — *Ixobrychus sinensis* (Gmelin)
   FBI 2237, 6(365) — BIP 57, 1(86) M, NC

THRESKIORNITHIDAE

10. White Ibis — *Thereskiornis aethiopica (melanocephala)* (Latham)
    FBI 2203,6(314) — BIP 69, 1(110) M, NC

11. Black Ibis — *Pseudibis papillosa (papillosa)* (Temminck)
    FBI 2204,6(316) — BIP 70, 1(112) M, NC

12. Lesser Whistling Teal — *Dendrocygna javanica* (Horsfield)
    FBI 2260, 6(411) — BIP 88, 1(138) M, NC

13. Pintail — *Anas acuta* Linnaeus
    FBI 2274, 6(437) — BIP 93, 1(149) W, NC

14. Common Teal — *Anas crecca (crecca)* Linne'
    FBI 2271, 6(431) — BIP 94, 1(151) W, NC

15. Spotbill Duck — *Anas poecilorhyncha (poecilorhyncha)* Forster
    FBI 2265, 6(421) — BIP 97, 1(159) M, NC

16. Gadwall — *Anas strepera (strepera)* Linne'
    FBI 2269, 6(426) — BIP 101, 1(163) W, NC

17. Garganey or Blue Winged Teal — *Anas guerguedula* Linne'
    FBI 2275, 6(439) — BIP 104, 1(169) W, NC

18. Shoveller — *Anas clypeata* Linne'
    FBI 2276, 6(442) — BIP 105, 1(172) W, NC

ACCIPITRIDAE

19. Blackwinged kite — *Elanus caeruleus (vociferus)* (Latham)
    FBI 1789, 5(125) — BIP 124, 1(212) R, C

20. Crestod Honey Buzzard — *Pernis ptilorhyncus (ruficollis)* Lesson
    FBI 1819, 5(167) — BIP 130, 1(222) R, C

21. Pariah or Black Kite — *Milvus migrans (govinda)* Sykes
    FBI 1787, 5(122) — BIP 133, 1(227) R, NC

22. Brahminy kite
FBI 1874, 5(118)
Haliastur indus (indus) (Boddaert)
RIP 135, 1(230) M ?, NC

23. Shikra
FBI 1803, 5(149)
Accipiter badius (dussumieri) (Temminck)
BIP 138, 1(235) R, C

24. Crested Goshawk
EBI 1810, 5(155)
Accipiter trivingatus (indicus) (Hodgson)
BIP 144, 1(240) R, NC

25. White-eyed Buzzard-Eagle
FBI 1774, 5(104)
Butastur teesa (Franklin)
BIP 157, 1(257) R, C

26. Crested Hawk-Eagle
FBI 1756, 5(85)
Spizhaetus cirrhatus (cirrhatus) (Gmelin)
BIP 161,1(262) R, C

27. Bonellis or Slender Hawk-Eagle
FBI 1752, 5(77)
Hieraactus fasciatus (fasciatus) (Vieillot)
BIP 163, 1(266) R, NC

28. Tawney Eagle
FBI 1749, 5(72)
Aguila rapax (vindhiana) Franklin
BIP 168, 1(276) M ?, NC

29. Black or king vulture
FBI 1706, 5(9)
Sarcogyps calvus (Scopoli)
BIP 178, 1(296) R, NC

30. Indian Whitebacked vulture
FBI 1713, 5(19)
Gyps bengalensis (Gmelin)
BIP 185, 1(307) R, NC

31. Indian Scavenger vulture
FBI 1715, 5(23)
Neophron percnopterus (ginginianus) (Latham)
BIP 187, 1(312) R, C

32. Pale Harrier
FBI 1790, 5(129)
Circus macrourus (SG Gmelin)
BIP 190, 1(319) W, NC

33. Short-toed Eagle
FBI 1764, 5(93)
Circaetus gallicus (gellicus) (Gmelin)
BIP 195, 1(327) R, NC

34. Crested Serpent Eagle
FBI 1766, 5(98)
Spilornis cheela (melanptis) (Jerdon)
BIP 197, 1(331) R, C

35. Osprep — *Pandion holieetus* (*haliaetus*) (Linne')
FBI 1704, 5(3) — BIP 203, 1(336) W, NC

36. Laggar Falcon — *Falco biafmicus* (*jugger*) JE Gray
FBI 1721, 5(37) — BIP 208, 1(344) M ? NC

37. Peregrine Falcon — *Falco peregrinus* (*japonensis*) Gmelin
FBI 1718, 5(32) — BIP 209, 1(347) W, NC

38. Shahin Falcon — *Falco peregrinus* (*peregrinator*)
FBI 1719, 5(34) — BIP 211, 1(350) M ?, NC

39. Hobby — *Falco subbuteo* Linnaeus
FBI 1724, 5(42) — BIP 212, 1(352) W, NC

40. Redheaded Merlin — *Falco chicquera* (*chicquera*) Daudin
FBI 1730, 5(47) — BIP 219, 1(359) M ?, NC

41. Lesser kestrel — *Falco naumanni* Fleischer
FBI 1740, 5(61) — BIP 221, 1(363) ?

42. European kestrel — *Falco tinnunculus* (*tinnunculus*) Linne'
FBI 1740, 5(61) — BIP 222, 1(365) W, C

PHASIANIDAE

43. Painted Partridge — *Francolinus pictus* (*pictus*) (Jardine & Selby)
FBI 1979, 5(412) — BIP 241, 2(27) R, C

44. Grey Partridge — *Francolinus pondicerianus* (*interpositus*) Hartert
FBI 1948, 5(421) — BIP 245, 2(30) R, NC

45. Grey Quail — *Coturnix coturnix* (*coturnix*) (Linne')
FBI 1950, 5(372) — BIP 250, 2(37) M ?, NC

46. Blackbreasted or Rain Quail — *Coturnix coromandelica* (Gmelin)
FBI 1952, 5(375) — BIP 252, 2(41) M ?, C

47. Jungle Bush Quail — *Pardicula asiatica* (*asiatica*) (Latham)
FBI 1953, 5(377) BIP 255, 2(45) R, C

48. Deccan Rock Bush Quail — *Perdicula argoondah* (*argoondah*) (Sykes)
FBI 1954, 5(379) BIP 260, 2(49) R, C

49. Painted Bush Quail — *Perdicula erythrorhyncha* (Sykes)
FBI 1955, 5(381) BIP 263, 2(53) R, C

50. Red spurfowl — *Galloperdix spadicea* (*spadicea*) (Gmelin)
FBI 1940, 5(358) BIP 275, 2(67) R, C

51. Painted Spurfowl — *Galloperdix lunulata* (Valenciennes)
FBI 1943, 5(362) BIP 278, 2(72) R, NC

52. Grey or Sonnerat's Junglefowl — *Gallus sonneratti* Temminck
FBI 1905, 5(298) BIP 301, 2(106) R, A

53. Indian Peafowl — *Pavo cristatus* Linne'
FBI 1897, 5(282) BIP 311, 2(123) R, A

TURNICIDAE

54. Little Bustard Quail — *Turnix sylvatica (dussumier)* (Temminck)
FBI 2003, 5(450) BIP 313, 2(128) M ?, C

55. Indian Yellowlegged Button Quail — *Turnix tanki* (*tanki*) Blyth
FBI 2005, 5(454) BIP 314, 2(129) M ?, C

56. Indian Bustard Quail — *Turnix suscitator* (*taigoor*) (Sykes)
FBI 1998, 5(447) BIP 318, 2(133) M ?, C

GRUIDAE

57. Demoiselle Crane — *Anthropoides virgo* (Linne')
FBI 2040, 6(47) BIP 326, 2(146) W, NC

CHARADRIIDAE

58. Redwattled Lapwing *Vanellus indicus* (*indicus*) (Boddaert)
FBI 2125, 2126,6 (187,189) BIP 366, 2(212) R, C

59. Yellow-Wattled Lapwing *Vanellus malabaricus* (Boddaert)
FBI 2128, 6(190) BIP 370, 2(218) R, NC

60. Little Ringed Plover *Charadrius dubius* Scopoli
FBI 2114, 2115, 6(71) BIP 380, 2(231) R, C

61. Common Redshank *Tringa totanus* (*totanus*) (Linne')
FBI 2147, 2148, 6(221-22) BIP 393, 394, 2(257) W, NC

62. Greenshank *Tringa nebularia* (Gunner)
FBI 2150, 6(225) BIP 396, 2(261) W, NC

63. Common Sandpiper *Tringa hypoleucos* (*hypoleucos*) Linne'
FBI 2145, 6(217) BIP 401, 2(271) W, C

64. Pintail Snipe (?) *Gallinago stenure* (Bonaparte)
FBI 2173, 6(263) BIP 406, 2(282) W, C

65. Common or Fantail Snipe(?) *Gallinago gallinago* (*gallinago*) (Linne')
FBI 2170, 6(259) BIP 409, 2(287) W, C

RECURVIROSTRIDAE

66. Indian Blackwinged Stilt *Himantopus himantopus* (*himantopus*) (Linne')
FBI 2130, 6(193) BIP 430, 2(329) M ?, NC

BURHINIDAE

67. Indian Stone Curlew *Burhinus oedicnemus* (*indicus*) (Salvadori)
FBI 2047, 6(77) BIP 436, 3(2) M, NC

68. Great Stone Plover *Esacus magnirostris* (*recurvirostris*) (Cuvier)
FBI 2049, 6(80) BIP 437, 3(5) M, NC

GLARIOLIDAE

69. Small Indian Pratincole — *Glareola lactea* Temminck
FBI 2056, 6(92) — BIP 444, 3(15) M, C

PTEROCLIDIDAE

70. Indian Sandgrouse — *Pterocles exustus* (*erlangeri*) (Naumann)
FBI 1893, 5(271) — BIP 487, 3(82) M, NC

71. Painted Sandgrouse — *Pterocles indicus* (*indicus*) (Gmelin)
FBI 1889, 5(264) — BIP 492, 3(92) M, NC

COLUMBIDAE

72. Green Pigeon — *Treron phoenicoptera* (*chlorigaster*) (Blyth)
FBI 1828, 5(184) — BIP 504, 3(108) R, A

73. Indian Blue Rock Pigeon — *Columba livia* (*intermedia*) Strickland
FBI 1856, 5(221) — BIP 517, 3(125) R, C

74. Turtle Dove — *Streptopelia orientalis* (Latham)
FBI 1872, 5(240) — BIP 532, 3(145) W, C

75. Ring Dove — *Streptopelia decaocto* (*decaocto*) (Frivaldszky)
FBI 1879, 5(248) — BIP 534, 3(147) M? C

76. Red Turtle Dove — *Streptopelia tranquabarica* (*tranquabarica*) (Hermann)
FBI 1881, 5(250) — BIP 535, 3 (149) M? C

77. Spotted Dove — *Streptopelia chinensis* (*suratensis*) (Gmelin)
FBI 1873, 5(242) — BIP 537, 3 (152) R, C

78. Little Brown or Senegal Dove — *Streptopelia senegalensis* (*combayensis*) (Gmelin)
FBI 1877, 5(246) — BIP 541, 3(163) R, C

PSITTACIDAE

79. Large Indian Parakeet — *Psittacula eupatria* (*nipalensis*) (Hodgson)
FBI 1497, 1498, 4(199, 200) — BIP 545, 3(164) R, C

80. Roseringed Parakeet — *Psittacula krameri* (*manillensis*) (Bechstein)
FBI 1500, 4(202) — BIP 550, 3(169) R, C

81. Blossomheaded Parakeet — *Psittacula cyanocephala* (*cyanocephala*) (Linne)
FBI 1503, 4(206) BIB 558, 3(179) R, C

CUCULIDAE

82. Pied Crested Cuckoo — *Clamator jacobinus* (*serratus*) (Sparrman)
FBI 1472, 4(167) BIP 570, 3(194) B, C

83. Common Hawk Cuckoo or Brainfever Bird — *Cuculus varius* (*varius*) Vahl.
FBI 1458, 4(148) BIP 573, 3(200) R, C

84. Indian Cuckoo — *Cuculus micropterus* (*micropterus*) Gould
FRI 1456, 4(144) BIP 576, 3(204) M? NC

85. Cuckoo — *Cuculus caronus* (*caronus*) Linne'
FBI 1451, 4(135) BIP 578, 3(208) M? C

86. Small Cuckoo — *Cuculus poliocephalus* (*poliocephalus*) Latham
FBI 1455, 4(142) BIP 581, 3(213) M ? NC

87. Indian Baybanded Cuckoo — *Cacomantis sonneratti* (*sonneratti*) (Latham)
FBI 1464, 4(157) BIP 582, 3(215) M ? NC

88. Indian Plaintive Cuckoo — *Cacomantis passerinus* (Vahl)
FBI 1462, 4(154) BIP 584, 3(218) M? NC

89. Indian Drongo-cuckoo — *Surniculus lugubris* (*dicruroides*) (Hodgson)
FBI 1470, 4(165) BIP 588, 3(224) M, NC

90. Indian Koel — *Eudynamys scolopacea* (*scolopacea*) (Linne')
FBI 1475, 4(172) BIP 590, 3(227) M ? C

91. Greenbilled Malkoha — *Rhopodytes viridirostris* (Jerdon)
FBI 1478, 4(177) BIP 595, 3(233) M, C

92. Sirkeer Cuckoo — *Taccocua leschenaultii* (*lesehenaultii*) Lesson
FBI 1486, 4(185) BIP 598, 3(237) R, C

93. Crow Pheasant
FBI 1492, 4(192)
Centropus sinensis (*parroti*) Stresemann
BIP 602, 3(243) R, C

STRIGIDAE

94. Indian Barn Owl
FBI 1636, 4(385)
Tyto alba (*startens*) Hartert
BIP 606, 3(250) R, C

95. Peninsular Scops Owl
FBI 1678, 4(434)
Otus scops (*rufipennis*) (Sharpe)
BIP 617, 3(263) R, C

96. Collared Scops Owl
FBI 1667, 4(424)
Otus bakkamoena (*marathae*) Ticehurst
BIP 622, 3(268) R, C

97. Great Horned or Eagle-Owl
FBI 1660, 4(414)
Bubo bubo (*bengalensis*) (Franklin)
BIP 627, 3(273) R, C

98. Dusky Horned Owl
FBI 1661, 4(416)
Bubo coromandus (*coromandus*) (Latham)
BIP 630, 3(278) R, NC

99. Brown Fish Owl
FBI 1653, 1654, 4(408, 409)
Bubo zeylonensis (*leschenault*) (Temminck)
BIP 631, 3(280) R, NC

100. Barred jungle Owlet
FBI 1694, 4(948)
Glauicidium radiatum (*radiatum*) (Tickell)
BIP 636, 3(286) R, C

101. Hawk Owl
FBI 1698, 4(454)
Ninox scutulata (*lugubris*) (Tickell)
BIP 642, 3(292) R, C

102. Spotted Owlet
FBI 1683, 4(439)
Athene brama (*brama*) (Temminck)
BIP 652, 3(382) R, C

103. Mottled Wood Owl
FBI 1694 (Part), 4(402)
Strix ocallata (*ocellata*) (Lesson)
BIP 657, 3(305) R, C

104. Brown Wood Owl
FBI 1646, 4(399)
Strix leptogrammica (*indrenee*) Sykes
BIP 659, 660, 660, a, 3(308) R, NC

105. Shorteared Owl
FBI 1643, 4(394)
Asio flammeus (*flammeus*) (Pontoppidan)
BIP 664, 3(314) ? O ?

CAPRIMULGIDAE

106. Indian jungle Nightjar — *Caprimulgus indicus* (*indicus*) Latham
FBI 1625, 4(366) BIP 671, 4(10) M?, C

107. Indian Little Nightjar — *Caprimulgus asiaticus* (*asiaticus*) Latham
FBI 1630, 4(372) BIP 680, 4(21) R, C

108. Franklins or Allied Nightjar — *Caprimulgus affinis* (*monticola*) Franklin
FBI 1629, 4(370) BIP 682, 4(23) R, C

APODIDAE

109. Whiterumped spinetail Swift — *Chestura sylvatica* (Tickell)
FBI 1606, 4(344) BIP 692, 4(37) R, NC

110. Alpine Swift — *Apus malb* (*nubifuga*) Koelz
FBI 1589 (Part) 4, (324) BIP 694, 4(40) R, C

111. Indian House Swift — *Apus affinis* (*affinis*) (JE Gray)
FBI 1596, 4(332) BIP 703, 4(51) R, C

112. Crested Tree Swift — *Hemiprocne longipennis* (*coronata*) (Tickell)
FBI 1616, 4(354) BIP 709, 4(58) R, NC

TROGONIDAE

113. Trogon ? — *Harpactes fasciatus* (*legerli*) Koelz
FBI 1585, (Part) 4(317) BIP 710, 4(61) R, NC

ALCEDINIDAE

114. Pied kingfisher — *Ceryle rudis* (*leucomelanura*) Reichenbach
FBI 1531, 4(246) BIP 719, 4(71) R, NC

115. Small Blue kingfisher — *Alcedo atthis* (*bengalensis*) Gmelin
FBI 1533, 4(250) BIP 723, 4(76) R, C

116. Whitebreasted kingfisher — *Halcyon smyrnensis* (*fusea*) (Boddaert)
FBI 1551, 4(269) BIP 736, 4(90) R, C

MEROPIDAE

117. Bluetailed Bee-eater — *Marops philippinus* (*philippinus*) Linne'
FBI 1526, 4(237) BIP 748, 4(106) M, NC

118. Green Bee-eater — *Marops orientalis* (*orientalis*) Latham
FBI 1523, 4(234) BIP 750, 4(109) M, C

CORACIIDAE

119. Roller or Blue jay — *Coracias benghalensis* (*benghalensis*) (Linne')
FBI 1517, 4(224) BIP 755, 4(116) R, C

UPUPIDAE

120. Hoopoe — *Upupa epops* (*ceylonensis*) Reichenbach
FBI 1581, 1582, 4(311, 312) BIP 765, 4(128) R, C

BURCEROTIDAE

121. Grey Hornbill — *Tockus birostris* (*Scopoli*)
FBI 1575, 4(301) BIP 767, 4(130) R, C

CAPITONIDAE

122. Green Barbet — *Megalaima zeylanica* (*ceniceps*) (Franklin)
FBI 1430, 4(110) BIP 780, 4(150) R, C

123. Crimsonbreasted Barbet or Coppersmith — *Megalaima haemacephala* (*indica*) (Latham)
FBI 1446, 1447, 4(127-128) BIP 792, 4(163) R, C

PICIDAE

124. Little Scalybellied Green Woodpecker — *Picus myrmecophoneus* Stresemann
FBI 1339, 4(10) BIP 808, 4(184) R, NC

125. Golden backed Woodpacker — *Dinopium benghalense* (*benghalense*) (Linn)
FBI 1394, 4(67) BIP 819, 4(197) R, C

126. Yellow fronted Pied or Mahratta Woodpecker — *Picoides mahrattensis* (*mahrattensis*) (Latham)
FBI 1374, 4(46) BIP 847, 4(226) R, C

127. Browncrowned Pygmy Woodpecker — *Picoides nanus* (*hardwickii*) (Jerdon)
FBI 1380, 4(52) BIP 852, 4(231) R, C

128. Heartspotted Woodpecker
FBI 1409, 1410, 4(84, 85)
Hemicircus canente (*Lesson*)
BIP 856, 4(236) R, NC

129. Blackbacked Woodpecker
FBI 1403, 4(77)
Chrysocolaptes festivus (*festivus*) (Boddaert)
BIP 858, 4(239) R, NC

PITTIDAE

130. Indian Pitta
FBI 1323, 3(453)
Pitta brachyura ((*brachyura*) (Linn)
BIP 867, 4(252) W, C

ALAUDIDAE

131. Redwinged Bush Lark
FBI 1235, 3(341)
Mirafra erythroptera (*arythroptere*) Blyth
BIP 877, 5(7) R, C

132. Ashycrowned Finch-Lark
FBI 1245, 3(353)
Eremopterix grisea (*Scopoli*)
BIP 878, 5(9) M, C

133. Indian Rufoustailed Finch-Lark
FBI 1242, (part) 3(350)
Ammomanes phoenicurus (*phoenicurus*) (Franklin)
BIP 882, 5(14) M, C

134. Rufous Short-toed Lark
FBI 1222, 3(326)
Calandrella cinerea (*dukhunensis*) (Sykes)
BIP 886, 5(21) W, C

135. Deccan or Syke's Crested Lark
FBI 1240, 3(347)
Galerida daya (Sykes)
BIP 902, 5(40) M? NC

136. Small Skylark
FBI 1215, 3(319)
Alauda gulgula (*gulgula*) Franklin
BIP 907, 5(46) R, C

HIRUNDINIDAE

137. Crag Martin
FBI 1149, 3(236)
Hirundo rupestris Scopoli
BIP 913, 5(53) W, C

138. Dusky Crag Martin
FBI 1150, 3(237)
Hirundo concolor (*concolor*) Sykes
BIP 914, 5(55) R, C

139. Swallow — *Hirundo rustica* (*rustica*) Linn
FBI 1152, 3(240) — BIP 916, 5(57) W, C

140. Wiretailed Swallow — *Hirundo smithii* (*filifera*) Stephens
FBI 1157, 3(245) — BIP 921, 5(63) R, C

141. Cliff Swallow — *Hirundo fluvicola* Blyth
FBI 1158, 3(246) — BIP 922, 5(64) R, C

142. Radrumped Swallow — *Hirundo daurica* (*nipalensis*) Hodgson
FBI 1161, 3(250) — BIP 925, 5(68) W, C

LANIIDAE

143. Grey Shrike — *Lanius excubitor* (*lahtora*) (Sykes)
FBI 706, 2(285) — BIP 933, 5(79) R, C

144. Baybacked Shrike — *Lanius vittatus* (*vittatus*) Valenciennes
FBI 710, 2(289) — BIP 940, 5(85) R, C

145. Rufousbacked shrike — *Lanius schach* (*erythronotus*) (Vigors)
FBI 714, 2(295) — BIP 946, 5(93) W, NC

146. Brown Shrike — *Lanius cristatus* (*cristatus*) Linn
FBI 719, 2(300) — BIP 949, 5(98) W, NC

ORIDLIDAE

147. Golden Oriole — *Oriolus oriolus* (*kundoo*) Sykes
FBI 953, 3(6) — BIP 953, 5(103) M,? C

148. Blackheaded Oriole — *Oriolus xanthornus* (*maderaspatanus*) Franklin
FBI 958 (Part,) 3(11) — BIP 959, 5(110) R, C

DICRURIDAE

149. Black Drongo or King Crow — *Dicrurus adsimilis* (*macrocercus*) Vieillot
FBI 766, 2(356) — BIP 963, 5(117) R, A

150. Grey Drongo — *Dicrurus leucophaeus* (*longicaudatus*)
FBI 775, 2(362) — BIP 965, 5(119) W, NC

151.	Whitebellied Drongo FBI 777 (part), 2(365)		*Dicrurus caerulescens* (*caerulescens*) (Linn) BIP 967, 5(122) R, NC
152.	Large Racket-tailed Drongo FBI 789, 2(378)		*Dicrurus paradiseus (grandis)* (Gould) BIP 976, 5(136) R, NC
		ARTAMIDAE	
153.	Ashy Swallow-shrike FBI 763, 2(348)		*Artamus fuscus* Vieillot BIP 982, 5(143) M, NC
		STURNIDAE	
154.	Greyheaded Myna FBI 982, 3(39)		*Sturnus malabaricus* (*malabaricus*) (Gmelin) BIP 987, 5(152) M, C
155.	Blackheaded or Brahminy Myna FBI 991, 3(29)		*Starnus pagodarum* (Gmelin) BIP 994, 5(160) M, C
156.	Rosy Starling or Rosy Pastor FBI 972, 3(29)		*Starnus roseus* (Linn) BIP 996, 5(163) W, NC
157.	Pied Myna FBI 1005, 3(63)		*Starnus contra* (*contra*) (Linn) BIP 1002, 5(172) R, C
158.	Indian Myna FBI 996, 3(53)		*Acridotheres tristis* (*tristis*) (Linn) BIP 1006, 5(177) R, A
159.	Bank Myna FBI 998, 3(55)		*Acridotheres ginginianus* (Latham) BIP 1008, 5(181) R, NC
160.	Jungle Myna FBI 999 (part), 3(57)		*Acridotheres fuscus* (*mahrattensis*) (Sykes) BIP 1010, 5(185) R, NC
		CORVIDAE	
161.	Tree Pie FBI 26 (part), 1(48)		*Dendrocitta vagabunda* (*pallida*) (Blyth) BIP 1031, 5(217) R, C
162.	House Crow FBI 11, 1(33)		*Corvus splendens* (*splendens*) Vieillot BIP 1049, 5(244) R, NC
163.	Jungle Crow FBI 6, 1(28)		*Corvus macrorhynchos* (*culminatus*) Sykes BIP 1057, 5(256) R, C

CAMPEPHAGIDAE

164. Blackbacked Pied Flycatcher-Shrike — *Hemipus picatus* (*picatus*) (Sykes)
FBI 724 (part) 2, (306) BIP 1065, 6(3) R, C

165. Wood Shrike — *Tephrodornis pondicerianus* (*pondicerianus*)
FBI 729, 2(312) BIP 1070, 6(11) R, C

166. Large-Cuckoo-Shrike — *Coracina novaehallandiae* (*macei*) (Lesson)
FBI 758, 2(343) BIP 1072, 6(14) M, C

167. Blackheaded Cuckoo-Shrike — *Coracina melanoptera* (*sykesi*) (Strickland)
FBI 756, 2(340) BIP 1079, 6(22) R, C

168. Scarlet (or Orange) Minivet — *Pericrocotus flammeus* (*flammeus*) (Forster)
FBI 737, 2(322) BIP 1081, 6(24) R, C

169. Small Minivet — *Pericorcotus cinnamomeus (cinnamomeus)* (Linn)
FBI 745, 747 (part), 2(329, 331) BIP 1093, 6(42) R, A

170. Whitebellied Minivet — *Pericrocotus erythropygius* (*erythropygius*) (Jerdon)
FBI 749, 2(332) BIP 1096, 6(45) R, NC

IRENIDAE

171. Iora — *Aegithina tiphia* (*humei*) Baker
FBI 364, 1(342) BIP 1099, 6(50) R, C

172. Jerdon's Chloropsis — *Chloropsis cochinchinensis* (*Jerdoni*) (Blyth)
FBI 374, 1(352) BIP 1107, 6(60) R, C

PYCNONOTIDAE

173. Redwhiskered Bulbul — *Pycnonotus jocosus* (*fuscicaudatus*) (Gould)
FBI 411, 1(396) BIP 1120, 6(77) R, C

174. Redvented Bulbul — *Pycnonotus cafer* (*cafer*) (Linn)
FBI 400 (part), 1(385) BIP 1128, 6(87) R, A

175. Whitebrowed Bulbul — *Pycnonotus lutsolus* (*lutsolus*) (Lesson)
FBI 433, (part), 1(417) BIP 1138, 6(98) R, NC

MUSCICAPIDAE

(TIMALIINAE)

176. Spotted Babbler — *Pellorneum ruficeps* (*ruficeps*) Swainson
FBI 240, 1(238) BIP 1154, 6(117) R, C

177. Deccan Scimiter Babbler — *Pomatorhinus schisticeps* (*horsfieldii*) Sykes
FBI 206, 1(210) BIP 1173, 6(134) R, C

178. Rufousbellied Babbler — *Dumatia hyperythra* (*hyperythra*) (Franklin)
FBI 229, 1(228) BIP 1222, 6(181) R, C

179. Yellow-eyed Babbler — *Chrysomma sinense* (*sinense*) (Gmelin)
FBI 234, 1(233) BIP 1231, 6(190) R, C

180. Common Babbler — *Turdoides caudatus* (*caudatus*) (Dumont)
FBI 192, 1 (198) BIP 1254, 6(215) R, C

181. Large Grey Babbler — *Turdoides malcolmi* (Sykes)
FBI 195, 1 (200) BIP 1258, 6(220) R NC

182. Jungle Babbler — *Turdoides striatus* (*orientalis*) (Jerdon)
FBI 188, 1(194) BIP 1262, 6(226) R, C

183. Quakar Babbler — *Alcippe poioicephala* (*brucei*) Hume
FBI 289. 1(278) BIP 1389, 7(122) R, C

(MUSCICAPINAE)

184. Redbreasted Flycatcher — *Muscicapa parva* (*parva*) Bechstein
FBI 638, 2(210) BIP 1411, 7(154) W, C

185. Whitebrowed Blue Flycatcher — *Muscicapa superciliaris* (*superciliaris*) Jerdon
FBI 647, 2(221) BIP 1421, 7(168) W, NC

186. Tickell's Redbreasted Blue Flycatcher — *Muscicapa tickelliae* (*tickelliae*((Blyth)
FBI 660, 2(234) BIP 1442, 7(193) R, C

187. Verditer Flycatcher — *Muscicapa thalassina* (*thalassina*) Swainson
FBI 665, 2(239) BIP 1445, 7(198) W, C

188. Greyheaded Flycatcher
FBI 679 (part), 2(254)
Culicicapa ceylonensis (*calochrysea*) Oberholser
BIP 1448, 7(202) W, C

189. Whitebrowed Fantail Flycatcher
FBI 700 (part), 2(277)
Rhipidura aureola (*aureola*) Lesson
BIP 1451, 7(207) R, C

190. Whitespotted Fantail Flycatcher
FBI 705 (part), 2(282)
Rhipidura albicollis (*albogularis*) (Lesson)
BIP 1458, 7(214) R, C

191. Paradise Flycatcher
FBI 688 (part), 2(264)
Terpsiphone paradisi (*paradisi*) (Linn)
BIP 1461, 7(218) R, C

192. Blacknaped Monarch Flycatcher
FBI 692, 2(270, 271)
Monarcha azurea (*styani*) (Hartlaub)
BIP 1465, 7(223) R, C

193. Streaked Fantail Warbler
FBI 825 (part) 2, (422)
Cisticola juncidis (*cursitans*) (Franklin)
BIP 1498, 8(33) R, C

194. Franklin's Ashy-grey Wren-Warbler
FBI 827 (part), 2(425)
Prinia hodgsonii (*hodgsonii*) Blyth
BIP 1503, 8(42) R, C

195. Rufousfronted Wren-Warbler
FBI 831, 2(429)
Prinia buchanani Blyth
BIP 1506, 8(46) R, C

196. Central India Plain Wren-Warbler
FBI 940 (part), 2(534)
Prinia subflava (*inornata*) Sykes
BIP 1511, 8(53) R, C

197. Ashy Wren Warbler
FBI 935 (part), 2(530)
Prinia socialis (*socialis*) Sykes
BIP 1517, 8(59) R, C

198. Peninsular Jungle Wren-Warbler
FBI 937 (part) 2, (532)
Prinia sylvatica (*sylvatica*) Jerdon
BIP 1521, 8(64) R, C

199. Tailor Bird
FBI 813 (part), 2(410)
Orthobomus sutorius (*guzuratus*) Latham
BIP 1535, 8(81) R, C

200. Striated Marsh Warbler
FBI 836, 2(435)
Megalurus palustris (*toklao*) (Blyth)
BIP 1548, 8(96) R, NC

201. Orphean Warbler
FBI 846, 2(448)
Sylvia hortensis (*jerdoni*) (Blyth)
BIP 1565, 8(122) W, NC

202. Tickell's Leaf Warbler
FBI 852, 2(454)
Phylloscopus affinis (*affinis*) (Tickell)
BIP 1579, 8(142) W, NC

203. Blackbrowed Flycatcher-Warbler
FBI 889 (part), 2(487)
Scicercus burkii (*whistleri*) Ticehurst
BIP 1614, 8(182) W, C

204. Turkestan Bluethroat
FBI 537, 2(85)
Erithacus svecicus (*pallidogularis*) (*Zarudny*)
BIP 1645, 8(218) W, NC

205. Indian Magpie-Robin
FBI 558 (part) 2(113)
Copsychus saularis (*saularis*) (Linn)
BIP 1661, 8(239) R, C

206. Redstart
FBI 532, 2(77)
Phoenicurus ochruros (*rufiventris*) (Vieillot)
BIP 1672, 8(255) W, C

207. Collared Bush Chat
FBI 495 (part) 2(28)
Saxicola torquata (*indica*) (Blyth)
BIP 1697, 9(28) W, C

208. Pied Bush Chat
FBI 492, 2(24)
Saxicola caprata (*burmanica*) Baker
BIP 1701, 9(34) R, C

209. Black Robin
FBI 557 (part), 2(111)
Saxicoloides fulicata (*intermedia*) Whistler and Kinnear
BIP 1719, 9(62) R, C

210. Blue Rock Thrush
FBI 608, 609, 2(175)
Monticola solitarius (*pandoo*) (Sykes)
BIP 1726, 9(73) W, NC

211. Malabar Whistling Thrush
FBI 613, 2(178)
Myiophonus horsfieldii (*Vigors*)
BIP 1728, 9(77) R, C

212. White throated Ground Thrush
FBI 588, 2(150)
Zoothera citrina (*cyanotus*) (Jardine & Selby)
BIP 1734, 9(89) R, C

213. Blackcapped Blackbird
FBI 569, 2(128)

Turdus merula (*nigropileus*) (Lafreshnaye)
BIP 753, 9(117) R, C

PARIDAE

214. Grey Tit
FBI 55 (part), 1(77)

Parus major (*stupae*) Koelz
BIP 1794, 9(169) R, A

215. Yellow-cheeked Tit
FBI 76 (part), 1(92)

Parus xanthogenys (*aplonotus*) Blyth
BIP 1810, 9(188) R, C

SITTIDAE

216. Chestnutbellied Nuthatch
FBI 110 (part), 1(123)

Sitta castanea (*castanea*) Lesson
BIP 1830, 9(215) R, C

217. Velvetfronted Nuthatch
FBI 119, 1(132)

Sitta frontalis (*frontalis*) Swainson
BIP 1838, 9(224) R, C

218. Spotted Grey Creeper
FBI 456 (part), 1(439)

Salpornis spilonotus (*spilonotus*) (Franklin)
BIP 1841, 9(229) R, NC

MOTACILLIDAE

219. Tree Pipit
FBI 1186, 1187, 3 (281, 282)

Anthus hodgsoni (*hodgsoni*) Richmond
BIP 1852, 9(243) W, NC

220. Indian Paddyfield Pipit
FBI 1195 (part), 3(290)

Anthus novaeseelandiae (*rufulus*) Vieillot
BIP 1859, 9(253) R, C

221. Blackbacked yellow-headed Wagtail
FBI 1192, 3(274)

Motacilla citreola (*calcarata*) Hodgson
BIP 1883, 9(284) W, C

222. Grey Wagtail
FBI 1174, 3(263)

Motacilla caspica (*caspica*) (Gmelin)
BIP 1884, 9(285) W, C

223. White Wagtail
FBI 1166, 3(257)

Motacilla alba (*dukhunensis*) Sykes
BIP 1885, 9(288) W, C

224. Masked Wagtail
FBI 1168, 3(259)

Motacilla alba (*personata*) Gould
BIP 1886, 9(291) W, C

225. Large Pied Wagtail — *Motacilla maderaspatensis* Gmelin
FBI 1172, 3(263) — BIP 1891 9(296) R, C

DICAEIDAE

226. Thickbilled Flowerpecker — *Dicaeum agile* (*agile*) (Tickell)
FBI 1311 (part), 3(435) — BIP 1892, 1894, 10(2) R, NC

227. Tickell's Flowerpecker — *Dicaeum erythrorhynchos* (*erythrorhynchos*) (Latham)
FBI 1308, 3(432) — BIP 1899, 10(10) R, NC

NECTARINIIDAE

228. Purplerumped Sunbird — *Nectarinia zeylonica* (*sola*) (Vieillot)
FBI 1287 (part), 3(406) — BIP 1907, 10(22) R, C

229. Purple Sunbird — *Nectarinia asiatica* (*asiatica*) (Latham)
FBI 1278, 3(396) — BIP 1917, 10(35) R, C

ZOSTEROPIDAE

230. White-aye — *Zosterops palpebrosa* (*palpebrosa*) (Temminck)
FBI 1247 (part) 1248, 1249, 1250, 3(358-61) — BIP 1933, 10(57) R, A

PLOCEIDAE

231. House Sparrow — *Passer domesticus* (*indicus*) Jardine and Selby
FBI 1096, 1097 (part), 3(170, 172) — BIP 1938, 10(63) R, A

232. Yellow throated Sparrow — *Petronia xanthocollis* (*xanthocollis*) (*Burton*)
FBI 1094, 3(166) — BIP 1949, 10(80) R, C

233. Baya — *Ploceus philippinus* (*philippinus*) (Linn)
FBI 1008 (part), 3(67) — BIP 1957, 10(88) R, NC

234. Streaked Weaver Bird — *Ploceus manvar* (*flaviceps*) Lesson
FBI 1013, 1014, 3(73, 74) — BIP 1962, 10(98) R, NC

235. Red Munia or Avadavat — *Estrilda amandava* (*amandava*) Linn
FBI 1036, 3(96) — BIP 1964, 10(101) R, NC

236. Green Munia — *Estrilda formosa* (Latham)
FBI 1017, 3(94) — BIP 1965, 10(103) — R, C

237. Whitebacked Munia — *Lonchura striata* (*striata*) (Linn)
FBI 1021, 3(83) — BIP 1968, 10(108) — R, NC

238. Spotted Munia — *Lonchura punctulata* (*punctulata*) (Linn)
FBI 1031, 3(91) — BIP 1974, 10(113) — R, C

239. Spotted Munia — *Lonchura punctuluta* (*punctulata*) (Linn)
FBI 1017, 1018, 3(78, 79) — BIP 1978, 10(118) — R, C

FRINGILLIDAE

240. Common Rosefinch or Scarlet Grosbeak — *Carpodacus erythrinus* (*erythrinus*) (*Pallas*)
FBI 1067, 3(135) — BIP 2013, 10(166) — W, C

EMBERIZIDAE

241. Blackheaded Bunting — *Emberiza melanocaphala* Scopoli
FBI 1133, 3(213) — BIP 2043, 10(207) — W, C

242. Redheaded Bunting — *Emberiza bruniceps* Brandt.
FBI 1134, 3(215) — BIP 2044, 10(209) — W, C

243. Greynecked Bunting — *Emberiza buchanani* (*buchanani*) Blyth
FBI 1129, 3(208) — BIP 2050, 10(219) — W, C

SUMMARY

Melghat Forests in Maharashtra are known for their richness in timber and wildlife resource. Almost fifty percent of the Melghat Forest tract was chosen for management under Project Tiger, thus in the year 1974 an area of 1571.74 square km. was declared to constitute a tiger reserve, which is now a Sanctuary. A bird survey was carried out within the tiger reserve area from the year 1973 to 1979. The survey established the presence of 243 species from 146 genera and 48 families. The paper discusses the survey and presents the list of species.

References

Ali Salim, Ripley S. Dillon 1983. Handbook of the Birds of India and Pakistan, Compact Ed. Oxford pp. 737.

Champion H.G., and Seth S.K. 1968. A Revised Survey of the Forest Types of India, Government of India Press pp. 404.

Joshi P.P. 1973. Working Plan for Melghat Forests, Government of Maharashtra Forest Department—Variously paged.

Ripley S. Dillon 1982. A synopsis of the Birds of India and Pakistan, BNHS, pp. 652.

Saharia V.B. and Sawarkar V.B. 1982. Wildlife Habitats and Relations to Silvicultural Practices, National Seminar on Forests and Environment, Bangalore, pp. 30.

Sawarkar V.B. 1984. *Lantana camara* on Wildlife Habitats with special reference to the Melghat Tiger Reserve, Cheetal 26 (1), pp. 24-38.

Shaikh K.A. and Sawarkar V.B. 1973. Wildlife Management Plan for the Melghat Tiger Reserve, Government of Maharashtra, Forest Department, pp. 282.

Write M.D. (Mrs.) 1942. Notes on the Birds of Berar, JBNHS XLIII (2), 428-445.

———

The Pench Bison—An Ecological and Behavioural Study

G.D. Dwivedi and Rakesh Shukla

Pench Wildlife Sanctuary, Kurai 480 880 (M.P.)

Introduction

The Bison or Gaur (*Bos gaurus*) has a wide range of distribution in the central high lands of our country and the trend of its population shows a rather slow increase and that too because of the effective conservation measures afforded to the species in different sanctuaries and national parks. In spite of its being a protected animal for over a decade there still seems to be a flaw somewhere in the detailed biological and ecological study of the Gaur and this is responsible for the present 'far from satisfactory' status of the species. What is most urgently required today is a detailed and thorough study of the Gaur throughout the country in the light of present forestry operations being carried out in different habitats of the animal. There are of course some other factors also such as epidemics of foot and mouth disease (Stewart, 1928; Ali, 1953) rinderpest (Anderson, 1954). Poaching and predation by large carnivores which do obstruct the upward trend of population but the most important is the indiscriminate disturbance in or destruction of the different habitats of the species all over the country. Since these forest based projects are also inevitable to meet the demand of the increasing human population, it is high time that the experts took up a country-wide project to minimize the impact of the so called development on the population of this species.

Study area

The study was undertaken in the Pench Sanctuary and its environ (which includes the adjoining part of the Pench National Park and Rukhar reserve forest). The study area is situated a few kilometres away from Seoni town in M.P. between 21° 52' to 21° 52' 30" North latitude and 79° 45' East longitude at an altitude from 560.6 to 720.3 m. above M.S.L.

The area of the Pench Sanctuary is about 118 sq. km. The climate is seasonal and can be classified into summer, rainy and winter. The rainfall is about 1396 mm. anually with a maximum of 44°C temperature in the month of May and a minimum of 3°C in December.

Habitat of Gaur

The vegetation of the study area can be classified into two types according to Champion and Seth (1968)

1. South Indian tropical moist deciduous forest with slightly moist teak.
2. Southern tropical dry deciduous teak bearing forest.

Due to undulating topogrpphy vegetation is formed in valleys and along water courses, slopes and plateausr. The valleys support a miscellaneous forest dominated by *Terminallia tomentosa* along with *Ficus religlosa, F. glomerata, Madhuca indica* and *Bridelia retusa* whereas along the water courses vegetation becomes semi evergreen type. Moderate slopes enjoy good quality teak forest with or without bamboos. The vegetation on plateaus is dominated by poor quality teak gradually replaced by *Anogeisus latifolia, Chloroxylon sweitinia* and *Sterculia urens*. The plants utilized by wild animals are mainly of lower canopy. Important ones are *Emblica officinalis, Aegle marmelos, Buchania lanzan, Semicarpus anacardium, Carreya arborea, Diospyros malanoxylon, Gardenia latifolia* etc. In open areas small grasslands are common and are the main source of food for wild herbivores. Bamboos and a rich growth of palatable grasses form an ideal habitat for wild animals along water courses and areas outside.

This is a general structure and composition of vegetation in the study area. The movement pattern of Gaur is restricted by the following points by which the habitat of Gaur can be characterized. (i) Uninhabitated and undisturbed vicinity (ii) Undulating landscape (iii) Availability of food and water and (iv) Cool and dense shelter in hot season. The above points suite the shy temperament and feeding and resting habits of Gaur and form an ideal habitat.

On the basis of the above points the distribution of Gaur can be localised in places such as Alikatta and Karmajhiri (Comptt. No. 7, 8, 9, 10, 39 and 52) Comptt. No. 50, 53, 68, 72, 73, 81, 82, 84, and 85 of the sanctuary and Comptt. No. 206, 207, 223, 224 and 225 of Rukhar reserve forest.

Strategy

The Gaur is a gregarious animal and a small herd is most likely to be a whole family whereas two or more families may unite to form a larger herd. There is no definite pattern of such large herds being formed among Gaur. Herd formation seems to be dependent upon the total number of animals and the availability of food and water in a particular area where small herds may come together accidentally.

The smallest herd seen in the study area consisted of four animals whereas the largest herd ever observed had seventeen animals though the most frequent herd size was 4-7 individuals.

It is easy to sex the animals but difficult to make assessment of their age in the wild. It is however possible to place the animals in a particular broad age category depending upon the visible external features such as shape and size of the body and horns as used by Fuller (1959). On the basis of this, three categories have been identified (i) Bull (ii) Cow (iii) Calf.

The identification of bulls and cows is more easily made by the presence of penis and vulva respectively.

The Gaur is an animal of dense wood cover and refrains from coming into the open unless the area is calm and quite. The Gaur prefers to graze in semi-darkness and a cooler climate. They come out of dense cover before dawn and start the long cycle of grazing under growth, browsing on the young and soft shoots and nibbling off the soft and tender bark of young trees. This is almost a regular daily routine. It is around 9 or 9.30 a.m. in summer (the temp. of the study area may rise upto 36-38°C) when the heat drives them again into the dense cover where they rest till late afternoon. The second cycle of feeding starts at about 4 p.m. when they again come out into the open and after some time go to the water hole to drink water and come back again to resume feeding till late evening or even at night. In winter and rains when the mornings are cooler and there is slight drizzle, the animals may stay out for a longer time (i.e. upto 11 or 12 noon). Gaur prefers to take rest in cool and shady places in thick cover. Though herds have also been located taking rest just along the forest roads which are not much frequented. Resting in such open or semi open places seems to relieve them of flies and mosquitoes which otherwise trouble them in dense cover.

The Gaur being a large animal feeds for almost 10 to 14 hours a day. It is a catholic feeder and its lower metabolic requirement per unit of body weight can tolerate lower quality food. However it requires a greater quantity of food. A single food item is not likely to form a greater proportion of a day's intake for these animals. During pinch period the Gaur hardly seems to differentiate between low and high quality food.

Gaur are shy and timid animals and have an acute sense of smell but poor hearing and eyesight. As soon as their privacy is invaded they raise their heads, gaze at the invaders calculatedly for a few seconds and then walk away swiftly. Though in same cases when there were two newly born calves, the herd stood there motionless with fixed gaze until their attention was diverted by clapping of hands. Old bulls have been observed

to lead permanent solitary lives. These are often erratic and unpredictable and may charge unprovoked. As the years pass by they seem to have lost all sense of fear and a few of them have been observed roaming along the national highway without the least care for traffic.

Inter-specific relations

Gaur can tolerate the presence of cheetal and nilgai. These herbivores have been observed feeding and drinking water together near the places such as the Dudhiya pond and Potia irrigaiion pond respectively. However the presence of gaur seems to make the cheetal a little hesitant and the cheetal, while feeding at a short distance, always keeps an eye on the slightest movement of the gaur.

Future strategy—High hopes

The management of wild-life can be made more effective and the interest of wildlife served better if the adjoining areas having a good wildlife potential are also included in the existing Sanctuaries and National parks. A such area is Rukhar reserve forest (area about 60 sq. kms.) which is separated from the Pench Sanctuary by the N.H.-7. This forest, If included in the present Pench Sanctuary, will definitely prove to be an extremely good step in this direction.

Acknowledgement

The second author is highly indebted to the Chief Wildlife Warden of M.P., Bhopal for granting him permission to take up a research project in the Pench Sanctuary.

Summary

The study of herds of Gaur was conducted in the Pench Sanctuary. The smallest and the largest herd observed during the study, consisted of four and seventeen animals respectively. The Gaur feeds on a wide range of food and spends a considerable long time on feeding as it requires a great absolute quantity of food. It is a gregarious animal and can also tolerate the presence of two otner species of herbivore. By nature the Gaur is very shy and timid and takes to flight when approached.

पेंच वायसन :– परिस्थिकीय एवं व्यवहार का एक अध्ययन जी०डी० द्विवेदी व राकेश शुक्ला

–: सारांश :–

गौर समुहों का अध्ययन पेंच अभयारण्य में किया गया था। अध्ययन के दौरान पाये गये सबसे छोटे एवं सबसे बड़े समूह में जानवरों की संख्या क्रमश: चार एवं सत्तरह थी। गौर के भोजन का क्षेत्र बहुत विस्तृत है और चूकि इसे अधिक मात्रा में भोजन की आवश्यकता होती है अत: यह बहुत अधिक समय खाने में व्यतीत करता है। यह एक समूह धारा प्राणी है एवं अन्य दो प्रजातियों के शाकाहारी की उपस्थिति भी समन कर सकता है। स्वभाव हे गौर बहुत शर्मीला व भीरू होता है और पास जाने पर भाग जाता है।

References

(i) Brander, A. 1923 – Wild animals in Central India.

(ii) Forsyth, I. 1919—The Highlands of Central India.

(iii) Gee, E.P. 1964—The Wildlife of India, Collins, London.

(iv) Prater, S.H. 1980—The Book of Indian adimals. B.N.H.S.

(v) Schaller, G.B. 1967—The deer and the tiger.

Tracking Wildlife The Easy Way

By
S.M. Osman and V.K. Verma

The aims and goals of this enquiry are to investigate alternative methods, of purely indigenous means, for accurately trailing the movements of any wild animal that is held under observation, and in the process we turn aside seeking to improve upon the existing practice of attaching, with a tell tale radio collar, any wild animal that has been overcome by the employment of dart-gun tranquillization procedure because, this conventional exercise carries dangers of side effects that could arise from its usage.

The primary need for isolating wildlife by means of a radio collar is to identify the individual, and to trace its peregrinations across a set terrain, over a period of time, and subsequently to study its behaviour and habit, its daily food intake and water requirement, its diurnal reaction to heat and cold, and a few other obscure phenomenon not properly understood heretofore. However all these articles of research lie within the province of the specialist, and do not fall under the prerogative of this paper which mainly deals with topics that concern the implanting on to a wild animal, identifiable substance that could easily provide clues for detection and supply the key to sketch its course through the bush.

The employment of a radio collar presupposes, first the immobility of an animal earmarked for the operation, and is always accomplished by firing a hypodermic dart, loaded with a tranquillizer through an ordinary gun. Injectable dose of tranquillizer is calculated against animal body weight. This method of working out drug quantity to be injected admits many serious flaws as the size or weight of any animal does not always indicate amount required for optimum results. What really matters significantly, in the case of any animal, is its sensitivity factor; a changeable component, entirely depending on the prevailing conditions.

In some cases, it is seen, that even a slight reduction in the amount of medicine to be injected can lead to a marked lessening of the tranquillizing effect by the drug, and the victim is then condemned to groggly rove over treacherous terrain, imperiled by snags and pitfalls. On the other hand a very slight overdose of tranquillizer could cause irreversible damage with far reaching consequences. The optimum dose for a given animal will vary, not merely according to its weight, but mainly its sensitivity, its mental alertness, and its body resistance at the time the experiment is carried out. In comparison to a mentally tense creature, the same animal when completely relaxed will obviously need

an unequal measure of identical drug in order to bring about the desired effect. In short when a tranquillizer is used its dosage is perforce a result of no deliberate calculating system, but primarily based on a crude method of approximation.

The use of dart-gun injection method is chiefly dependent on a means of propulsion that carries it to its target where the needle impinges and is held in position by a barb that anchors it to the spot. The basic unit for this dart comprises of a syringe encapsulated within a cylindrical structure that in addition holds a small charge of powder, a percussion cap, and a floating striker which detonates the cap on impact with the target. In this manner the powder is ignited and hot expanding gases from this push the piston in the syringe to empty its contents into the body of the animal that has been hit. Theoretically all this is expected to operate in a normal manner however, in the event of a slight malfunction, by anv one of the measures mentioned earlier; from the barb clinger on the needle to the striker mechanism that is responsible for pushing the contents of the syringe into the animal,s body, the desired quantity of medicine may not get properly delivered. Unfortunately the nature of this exercise leaves the experimentor unaware of the actual position once the dart is fired at the animal.

Let us assume that the animal, despite all uncertainties mentioned earlier, gets immobilized by the action of the dart, and that it later has been furnished with a radio collar, and still later returned to normal by the timely injection of antidote medicine; the actual utility of signals transmitted by the radio collar remain of a questionable character since these signals declare the whereabouts of the owner within the limited framework of a narrow margin. One reason for this is that signals cannot be picked up from the transmitting collar should the source happen to be screened by a ridge or a hillock. In the event of the source being hidden by a depression in the ground, it also becomes impossible to receive information transmitted by the collar. The best results are achieved by a line of sight transmission. Such terrain is not always easy to find in the type of country bordering the Siwaliks. Finally a radio collar may disclose the position of an animal that wears it but certainly leaves no clues regarding its gyrations once the animal has shifted to a new scene or at times when the monitoring equipment is not being used, such as in the night.

For example a radio collared elephant may roam over immense territory during the night to return to its original station at dawn; ergo dusk to dawn movement by the animal especially at a time when the receiving station is switched off, will remain unaccounted and unknown. In the day however signals may be picked up by a live receiver, and the elephant's position in the bush confirmed and plotted. This simple task

could in any case be easily accomplished by an experienced tracker skilled in the ways of animal observation and woodcraft, and needless to say without the aid of any telemetry equipment to guide him. No two wild animals are alike but it needs the expertness and ability of a trained forester worthy of that name to find out the required one, and any such worthy should be able to accomplish this simple task very easily.

It is not with the intention to decry the use of radio collars or the manner by which they are placed in position, but with a view to accomplish parallel results, without having to submit the animal under investigation to unnecessary risk and stress that alternate ways and means are explored. As may be seen two great questions before us, in fulfilling this task, concern the implanting of an identifiable source on the animal, and later means of tracking the animal's transition through the jungle, and this even after it has moved several miles away from the scene.

The primary issue I (a) is of fixing a detection device, in the form of high intensity long lasting scent to the body of any animal and (b) to label the same animal by staining some part of its body with brightly coloured dye so that its presence in a herd can easily be recognized.

The next issue (II) is means of monitoring the animal's progress and following its course through the forest even days after it has passed through a certain area. This aspect of search is particularly important because under similar circumstances, a radio collar would reveal nothing since it does not leave behind a trail of any sort—and hence nocturnal drift by the animal that wears a radio collar cannot be plotted.

We now consider ways and means of delivering the scent to its target, and marking the quarry with a brightly coloured dye that is recognisable at a glance. For this act, a bowgun with an effectively accurate range of upto thirty metres can be designed and easily constructed for not more than rupees four hundred approximately. In addition missiles loaded with a quick drying scent concentrate as well as a similar projectile filled with orange coloured dye, can be planned and fabricated, and should cost no more than Rs. 30.00 each. Roughly speaking, we shall have for a paltry sum of not more than five hundred rupees, within our means not only a vehicle of delivery for the dye and scent concentrates, but also means of propulsion for the same.

There appears to be two most successful methods of operation for the effective delivery of these express devices. The first being to seek and imprint scent and label the target. This can be achieved by following the earmarked animal with the aid of a tame elephant from whose back the entire operation may be directed. The other method would

be to drive the animal intended for this job, towards and close enough to a concealed operator who can with his bowgun secure definite hits as the animal passes by. A slight variant to this would be to lure with food any animal to within easy shooting range of a man with the bowgun sitting up on a machan. Sitting over a water hole would be yet another approach to the problem. Assuming that an animal has been fixed with scent and daubed with dye, following it through the forest is comparatively an easy task for that all that is now required is the service of a gundog trained to follow the implanted scent, and it is not difficult to develop a programme for the training of gundogs to follow some specific scent.

Dogs have been and are being trained by the South Western Research Institute in San Antonia Texas, to indicate if a person is carrying a hand gun. As a final test for these dogs, someone absolutely unknown to the tracker dog is dressed with a new suitcoat and also made to wear an overcoat as well. A handgun is then hidden in the inside pocket of his suitcoat. The scent of gunmetal, as well as the minute traces of scent given off by burnt gunpowder from inside the gunbarrel always proved sufficient to unerringly attract the dogs to the man. Such dogs are known as cover dogs and are regularly employed by security agents, specially in a crowd of people gathered to listen to a VIP speaker.

In view of this difficult and complicated tracking, as already described, to be able to follow the trail of an imprinted scent such as the one suggested for attaching to wild animals, it obviously is comparatively an easy task which may effortlessly be accomplished by any army or police dog in addition to gundogs. The prospect of success for such a scheme appear to be quite rewarding and it is felt that the project, at the negligible cost it offers itself requires looking into.

———

Wildlife Legacy of India

"If we were to look the whole world to find out the country richly endowed with all wealth, power and beauty that nature can bestow in some parts, a very paradise on earth—I should point out to India", naturalists, philosophers and bio and geo scientists would perhaps not hesitate to share this opinion of Maxmuellar. India, stretched between the towering heights of the mighty Himalaya down to the levels of Indian Ocean, indeed can boast for a most variable, spectacular and often thrilling assets of nature. The cultures evolved here through the ages have been aware of this natural heritage, they lived and enjoyed it, and were infact proud of it. They very closely used to study and watch the various moods and modes of nature, and were thus able to define and describe some of its secrets. Thus, the sophisticated science of ecology and the vitality of natural balance was known to the Indians in distant past, which is well evident from the following quotation of the Atherva Veda :

यत ते भूमे विश्वनामि, क्षिप्रं तदपि एहतु ।
मा ते मर्म विमृग्वरी, मा ते हृदममीपपम ।

(Whatever I take from earth, may that have quick growth again, O Purifier, may we not injure thy vital part or thy heart.)

This country has had a very glorious past, particularly for her rich wildlife wealth. The diverse and yet extensive and undisturbed habitats, primeval jungles, deserts and rugged mountainous terrain, rendered safe harbourage to the wild denizens. Infact, the wildlife has for long, enjoyed a very privileged position in the country. Since the people of history were aware of the role of every large and small creature in maintaining the natural balance, they very intelligently blended these creatures with religion, mythology and folk culture. Wildlife and its habitat (forests) were protected as an essential part of religious practice. To ensure them further protection, wildlife was associated with gods and goddesses in one or the other way. For instance, most of the three hundred and thirty million (*teteesh crore*) gods of Hindus have their mount one or the other animal, *viz.*, among the *Panch Parmeshwara's* (five major gods), Brahma or the *Creator* has Rajhansa (swan), Vishnu or the *Preserver* has Garuda (Eagle), Shiva or the *Destroyer* has Nandi (Bull), *Shakti*, the goddess of power and strength has Lion, and the *Ganesha* or the *Vigneshwara* has mouse as the mount. Furthermore, there are many citings in the religious literature when the gods incarnated into one or the other animal form, either to test their devotees or to eliminate the evil soul; *Narsinghavatar*, *Matsyavtar*,

Barahvatar, Kurmavtar and the like are such examples. 'God has created every large and small creature of the world and is present in all of them (and so do not hurt them)' is one of the essentials of the Hindu Dharma. The religious dicta and traditional sentiments, thus for long, saved the animals from indiscrimination. So much so, that even today, any god-fearing Hindu seldom dare kill even a snake, monkey, langur, tiger or eagle, because of the religious dignity attached to them.

All the 'Religious Institutions', 'Ashramas' and 'Forest Universities' were established close to nature, and so, the ancient literature. 'The Vedas', 'Upnishadas' and 'The Great Epics' are full of love and compassion for all beings, animate or inanimate. 'Love of nature' was the essence of Ashrama education system. For the Wild animals, these Ashramas were virtually the *Sanctum-Sanctorum*, where every effort was made to keep them in perfect harmony. One of the quotations from the 'Aranyakanda' of Ramayana describing the environment of the Ashrama of Rishi Agastya, to some extent supports this ethics :

स्निग्धं पत्रा यथा वृक्षा, क्षान्ता मृग द्विजा ।
आश्रमो नास्ति दूरस्तो, महर्षि भीवितास्न ।।

(Here the leaves of trees are beautiful and smooth, and the animals and birds are wise and fearless and quiet as were heard. It seems that the Ashrama of Maharshi Agastya is very near).

The spirit of love and compassion for wildlife pervaded until four hundred B.C. Kautilya in his 'Arthshastra' has laid down a specific code of conduct for all and the laws were enforced under strict supervision for the protection of wild animals, so much so, that even dangerous animals were killed only after being removed from the 'Abhayaranyas' (protected game forests). Killer of an elephant was punished to death. Afforestation was also considered essential. Ashoka (272-232 B.C.) made the game laws more elaborate and strong, which were mentioned as *Dharm-Niyamas* (duty of moral discipline). In his fifth pillar edict, Ashoka has carved a list of birds, mammals, fish, insects, as well as plants, which were protected by law. During the period of Guptas the management of forests and wildlife was further improved. King Harshavardhana and many other Hindu rulers were also imbibed with this spirit. The animals depicted on the Sanchi Stupa, Ajanta Fredcoes, Khajuraho and numerous other temples, is an eloquent testimony of the care taken of animals.

Such has been the wildlife legacy of India. However, with the changing socio-economic and cultural values during the subsequent periods, forest and wildlife began to witness deterioration. The pace of deterioration was particularly accelerated with

the advent of Muslims. During Moghul rule, big game hunting became a status symbol of bravery, social prestige and a major form of recreation and sport. Akbar is said to have kept three thousand trained cheetah's for hunting antelopes. Emperor Jehangir, otherwise a noted naturalist, shot among others, 889 Nilgai. With the increase in human population more and more land was brought under plough and urban complexes, exerting excessive pressure on the wildlife habitats. Wanton and indiscriminate killing of wildlife further increased manifold during the time of British and 'Feudal Lords' who used to kill the poor creatures for fun, frolic and fur. The British officers and traders used to carry home regularly the trophies of lion, tiger, leopard, Rhino horns and elephant tusks. During those times a booming souvenir industry based on the wildlife also flourished in the country. Thousands of books were written on 'Shikar in India', which stagger the imagination of the massive slaughter of the wild animals during the last few centuries. The extent of this large scale hunting is well evident from the following few citings :—

—Maharaja Nirupendra of Cooch Bihar, between 1871-1907, shot 370 tigers, 208 Rhinos, 430 Buffaloes and 324 Barasinghas.

—Late Majaraja of Rewa, among others shot 616 tigers during his lifetime.

—Maharaja of Sarguja holds the record with 1116 tigers.

—In Kashmir, a single hunter accounted for killing 58630 wild fowls between 1907-1919.

—In 1938, Lord Linlithgow and his party shot 4273 ducks and geese in Bharatpur.

—F.F. Simson shot 500 tigers in 21 years.

—There was a record shooting of 80 lions in a single day, by a party in Gir forests.

It was with the beginning of the third decade of this century to the time of second World War, when a most uneasy period of semi-security for wildlife set-in. While hunting caught new dimensions, forests were cleared for timber and for making room for the vast army camps. Many of the best wildlife habitats, particularly in terai and foothills were further destroyed for meeting the supply of timber, ballis, bamboo, fuel and charcoal to the troops in India and Middle East. Demand for railway sleepers went on increasing. Troops also killed the wild animals at war level.

By the time war ended, Indian having been relieved from restraints threatened the wild denizens. Released from control, Indians shot down the animals everywhere including national parks, sanctuaries and private estates. Numerous guns and large quantities of ammunition were issued to farmers to protect their crops. Large scale land clearings were made to introduce new cultivations. This was also the period when a new breed of shikaris

emerged—the motorized one, who would shoot at any eye reflecting the beam of flashlight. Hunters were also employed by the city merchants to make profit out of the various animal products. It was the period when most of the animals became endangered while the prestigious cheetah became extinct. Even now, the tremendous increase in human population, urbanization, industrialization and the ill planned developmental activities are together exerting immense pressure on the remaining wildlife habitats. Increased competition with the ever-increasing domestic livestcok (which is mostly unproductive) clear felling, increased incidences of forest fires, poaching and other encroachmental activities by man are leading to their further destruction. These activities have already taken a considerable toll, to the extent that as many as 60 species of mammals and 38 of birds have been listed as rare and endangered under the wildlife (protection) act. The Zoological Survey of India has further elaborated this list to 76 species of mammals, 47 of birds and 13 of reptiles. Infact, most of the wildlife species in the country are witnessing a continuous decrease in their population.

Fortunately, now, once again, India seems to be awakening for her long forgotten love for the wildlife and forests. Establishment of more than 500 wildlife reserves (national parks, wildlife sanctuaries and equivalent reserves) is an evidence. Particular attention was paid during and after the seventies, when the game laws were made more strict. Now strict ban has been imposed on the hunting of rare and endangered fauna. Both hunting and clear felling have been prohibited in the ecologically more sensitive areas, particularly in the hills. Continuous efforts are being made towards habitat improvement. Special projects are already in progress for conservation of the dwindling fauna, *viz.*, Project Tiger, Project Crocodile. Project Rhino, Project Elephant, and the like. Many more such projects are under consideration. Considerable encouragement is being given to researches related with various aspects of wildlife and nature conservation. With the increased awakening among the citizenery of the country and the efforts being made by the government for the conservation of wildlife species, let us hope for a bright future for wildlife in the country.

———

Cheetal—Vol. 29, No. 1

A Check List of Fishes of Rewa District Madhya Pradesh (India)

Rajendra M. Saxena

Zoology Research Laboratories, D.A.V. College, Dehra Dun-248001

Abstract

The present paper deals with a check-list of 81 species belonging to 54 genera and 21 families so far recorded for the first time from the watersheds of Rewa district of Madhya Pradesh. A special care has been taken to follow International Rules of Zoological Nomenclature while preparing the up-to-date systematic list of fishes.

Introduction

The knowledge of fish fauna of an area is a prerequisite for any study from fisheries and ecological point of view and also for proper management and exploitation of the existing fishery resources. The faunal study is of utmost importance from zoo-geographical view point, too. The fish fauna of M.P. has been a subject of study by a number of workers in the past. Francis Day (1875-1878) was the first who mentioned M.P. (Central Province) against a number of species while describing their distribution in India. Thereafter, the fishes of other areas in M.P. attracted the attention of many workers dealing purely with faunistics or fisheries. A few important reference in this regard may be cited are those of Annandale (1919); Trevenen (1930); Hora (1938, 1940 and 1941); Swarup (1953); Dubey (1955); Dubey and Tuli (1959 and 1961); Dubey and Mehra (1959); Khan (1959); Mehra (1959); Soni (1959 and 1960); Tuli and Mehra (1960); Malviya (1961); Mukherjee and Saxena (1967); Dubey and Verma (1968); Verma (1969); Tilak (1970); Rao and Sharma (1972); Tripathi (1973); Karamchandani and Mishra (1975); Mathur and Mishra (1976) and Tilak and Sinha (1979).

A thorough screening of the above mentioned and other relevant references has revealed that the fish fauna of topographically characteristic Rewa district of Madhya Pradesh has not been worked out so far.

Taking into consideration the vast aquatic habitats in the form of perennial rivers (with plain, plataeu, gorgeous course, stagnant pools in between and more particularly

heavy 'waterfalls' on them) flowing through the district and also large and small impoundments (ponds, tanks and lakes etc.) it was felt desirable to workout the fish fauna of Rewa district and make it readily available to future research workers and the like. In the present paper an attempt has been made to put forth an up-to-date check-list of fishes from the various sampling stations selected for the purpose. The results presented in the systematic list are after a survey of the area conducted during 1985-1987. Undoubtedly, this is the first paper of its kind to add knowledge to the available literature on the fish fauna of Madhya Pradesh.

Systematic-List

In the systematic list given here the classification adopted largely follows that proposed by Greenwood *et al.* (1966) and Rosen and Patterson (1969) with slight modifications. A total of **81** species belonging to **54** genera and **21** families are so far recorded from the watersheds of Rewa district. The genera under the families and the species under the genera are arranged alphabetically irrespective of their phylogenetic relationships.

Species	Local Name	Locality	Maximum Length (mm)
Class : Teleostomi Division: I Super order—Clupeomorpha Order :—Clupeiformes Suborder : —Clupeoidei Family : Clupeidae Genus : *Hilsa* Regan, 1917			
1. *Hilsa ilisha* (Hamilton) Genus : *Gudusia* Fowler, 1911	Hilsa	2	430
2. *Gudusia chapra* (Hamilton) Genus : *Goniolosa* Regan, 1917	Suiya	2, 3, 10	130
3. *Goniolosa manmina* (Hamilton) Family : Engraulidae Genus : *Setipinna* Swainson 1839	—	2	165

Species	Local Name	Locality	Maximum Length (mm)
4. *Setipinna phasa* (Hamilton) Division : II Super order : Osteoglossomorpha Order : Osteoglossiformes Sub-order : Notopteroidei Family : Notopteridae Genus : *Notopterus* Lacepedae, 1800	Patokhi	2	225
5. *Notopterus chitala* (Hamilton)	Cheetal, Mohi	2, 3, 7, 10, 12	160
6. *Notopterus notopterus* (Pallas) Division : III Super order : Ostariophysi Order : Cypriniformes Suborder : Cyprinoidei Family : Cyprinidae Genus : *Amblypharyngodon* Beeker, 1859	Patola, Pholi	2, 3, 7, 10, 12	230
7. *Amblypharyngodon mola* (Hamilton) Genus: *Aspidoparia* Heckel, 1848	Dhawai	1, 2, 3, 6, 7, 9, 12	50
8. *Aspidoparia morar* (Hamilton) Genus : *Barilius* Hamilton, 1822	Chelhwa	2, 3, 5, 6, 7, 9, 10, 11, 12	130
9. *Barilius barila* Hamilton	Jhalan	1, 2, 5, 6, 8, 9, 10	65
10. *Barilius barna* Hamilton	Durangni	1, 2, 5, 6, 8, 9, 10	68
11. *Barilius bendelisis* (Hamilton)	Guderi	1, 5, 6, 8, 9, 10	90
12. *Barilius bola* (Hamilton)	Ghilra	1, 5, 6, 7, 8, 9, 10, 12	220
13. *Barilius vagra* Hamilton Genus : *Brachydanio* Weber and De Beaufort, 1916	—	1, 2, 5, 6, 8, 9, 10	35

	Species	Local Name	Locality	Maximum Length (mm)
14.	*Brachydanio rerio* (Hamilton) Genus : *Catla* Valenciennes, 1844	—	1, 2, 5, 6, 7, 9, 10, 12	30
15.	*Catla catla* (Hamilton) Genus : *Chagunius* Smith, 1938	Catla	2, 3, 7, 10, 11, 12	250-450
16.	*Chagunius chagunio* (Hamilton) Genus : *Chela* Hamilton, 1822	Utta	1, 2, 3, 5, 6, 7, 12	160
17.	*Chela* (*Chela*) *cachius* (Hamilton) Genus : *Cirrhinus* (Oken) Cuvier, 1817	Phool	1, 2, 3, 5, 6, 7, 10, 11, 12	42
18.	*Cirrhinus mrigala* (Hamilton)	Mrigal, Nain	2, 3, 5, 7, 12	245-265
19.	*Cirrhinus reba* (Hamilton) Genus : *Crossocheilus* van Hasselt, 1823	Rewa, Bhagan	2, 3, 5, 6, 7, 9, 10, 11, 12	162
20.	*Crossocheilus talius* (Hamilton) Genus : *Ctenopharyngodon* Steindachner, 1866	Gauma	1, 5, 6, 8, 10, 12	90
*21.	*Ctenopharyngoden idellus* (Valenciennes) Genus : *Cyprinus* Linnaeus			—
*22.	*Cyprinus Carpio Communis* Linnaeus Genus : *Danio* Hamilton, 1822	—		—
23.	*Danio devario* (Hamilton) Genus : *Esomus* Swainson, 1839	— —	2, 3, 6, 7, 8, 9, 10, 12	30
24.	*Esomus danricus* (Hamilton) Genus : *Garra* Hamilton, 1822		1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12	45
25.	*Garra gotyla gotyla* (Gray)	Budena	1, 2, 5, 6, 9, 10, 12	97

*Culturable carps

	Species	Local Name	Locality	Maximum Length (mm)
26.	*Garra mullya* (Sykes) Genus : *Labeo* Cuvier, 1817	—	1, 2, 3, 5, 6, 8, 9, 10, 12	45
27.	*Labeo bata* (Hamilton)	Bata	2, 3, 10, 12	162
28.	*Labeo boggut* (Sykes)	Goria	2, 3, 10, 11, 12	145
29.	*Labeo calbasu* (Hamilton)	Kalot	2, 3, 5, 7, 10, 11, 12	210
30.	*Labeo dyocheilus* McClelland	Khiront	1, 2, 3, 6, 7, 10, 12	190
31.	*Labeo fimbriatus* (Bloch)	Rohu Dogla	2, 3, 7, 10, 12	185
32.	*Labeo gonius* (Hamilton)	Khursa	2, 3, 7, 10, 12	164
33.	*Labeo rohita* (Hamilton) Genus : *Osteobrama* Heckel, 1842	Rohu	2, 3, 7, 10, 12	180-700
34.	*Osteobrama cotio cotio* (Hamilton) Genus : *Pseudoxygaster* Banarescu, 1967	Gurda	1, 2, 3, 6, 7, 9, 10, 11, 12	101
35.	*Pseudoxygaster gora* (Hamilton) Genus : *Puntius* (Hamilton)	—	2, 6, 10	174-248
36.	*Puntius chola* Hamilton	Khabdi	1 to 12	125
37.	*Puntius sarana sarana* (Hamilton)	Sherni	1, 2, 3, 5, 6, 7, 9, 10, 11, 12	185
38.	*Puntius sophore* (Hamilton)	—	1, to 10, 12	45
39.	*Puntius ticto* Hamilton Genus : *Rasbora* Bleeker, 1859	—	1 to 12	55
40.	*Rasbora daniconius daniconius* (Hamilton) Genus : *Salmostoma* Swainson, 1839	Anjra —	1, 2, 3, 5, 6, 7, 9, 10, 12	60
41.	*Salmostoma bacaila* (Hamilton)		1, 2, 3, 5, 6, 7, 9, 10, 11, 12	95-135

	Species	Local Name	Locality	Maximum Length (mm)
42.	*Salmostoma clupeoides* (Bloch) Genus : *Tor* Gray, 1833-34	—	2, 3, 6, 10	128-137
43.	*Tor putitora* (Hamilton)	Mahasheer, Badas	2, 6, 10	230
44.	*Tor tor* (Hamilton) Family : Cobitidae Genus : *Botia* Gray, 1831	Mahasheer	2, 6, 10, 12	220
45.	*Botia dayi* Hora Genus : *Lepidocephalus* Bleeker, 1858	Bania	1, 2, 8 to 12	80
46.	*Lepidocephalus guntea* (Hamilton) Genus : *Noemacheilus* van Hasselt, 1823	Gitu	1, to 10, 12	65
47.	*Noemacheilus botia* (Hamilton) Order : Siluriformes Family : Siluridae Genus : *Ompok* Lacepede, 1803	Natwa	1, to 10, 12	45
48.	*Ompok bimaculatus* (Bloch)	—	2, 3, 6, 7, 10, 12	145
*49.	*Ompok pabda* (Hamilton) Genus : *Wallago* Bleeker, 1851	Pabda	2, 3, 7, 10, 12	130
50.	*Wallago attu* (Bloch and Schneider) Family : Bagridae Genus : *Mystus* Scopoli, 1777	Padin or Lanchi	2, 3, 7, 10, 12	545
51.	*Mystus* (*Mystus*) *bleekeri* (Day)	Haror	1, 4, 6 to 10, 12	108-120
52.	*Mystus* (*Mystus*) *cavasius* (Hamilton)	Jolga	2, 3, 6, 7, 10, 12	265
53.	*Mystus* (*Mystus*) *vittatus* (Bloch)	—	1 to 10, 12	665

	Spacies	Local Name	Locality	Maximum Length (mm)
54.	*Mystus* (*Aorichthys*) *aor* (Hamilton)	Dingra, Tengan	2, 3, 10, 12	330
55.	*Mystus* (*Aorichthys*) *seenghala* (Sykes) Genus : *Rita* Bleeker, 1853	Singhara	2, 3, 10, 12	782
56.	*Rita rita* (Hamilton) Genus : *Amblyceps* Blyth, 1858	Chona	2, 6, 10	335
57.	*Amblyceps mangois* (Hamilton) Family : Schilbeidae Genus : *Ailia* Gray, 1831	—	5, 8, 10	55
58.	*Ailia Coila* (Hamilton) Genus : *Clupisona* Swainson 1830	—	2, 10	155
59.	*Clupisoma garua* (Hamilton) Genus : *Eutropiichthys* Bleeker, 1862	Baikra	2, 10	260
60.	*Eutropiichthys vacha* (Hamilton) Genus : *Silonia* Swainson, 1839	Bachwa	2, 6, 10	302
61.	*Silonia silondia* (Hamilton) Family : Claraiidae Genus : *Clarias* Scopoli, 1777	Silond	2, 10	150
62.	*Clarias batrachus* (Linnaeus) Family : Heteropneustidae Genus : *Heteropneustes* Muller, 1842	Magur	2 to 12	214
63.	*Heteropneustes fossilis* (Bloch) Family : Sisoridae Genus : *Bagarius* Bleeker, 1853	Singhi	1 to 12	225
64.	*Bagarius bagarius* (Hamilton) Genus : *Glyptothorax* Blyth, 1890	Gaunch, Lambhar,	1, 2, 3, 7, 10, 12	855
65.	*Glyptothorax telchitta* (Hamilton) Genus : *Laguvia* Hora, 1921	—	1, 5, 8, 9, 10	55

Species	Local Name	Locality	Maximum Length (mm)
66. *Laguvia ribeiroi ribeiroi,* Hora Super order : Atherinomorpha Order : Atheriniformes Suborder : Exocoetoidei Family : Belonidae Genus : *Belone* Cuvier, 1817	—	1, 7	40
67. *Belone cancila* (Hamilton) Super order : Acanthopterygii Order : Channiformes Family : Channidae Genus : *Channa* (Gronovius, 1763) Scopoli, 1777	Suja	2, 3, 7, 12	125
68. *Channa marulius* Hamilton	Sol	2, 3, 7, 10, 12	190-410
69. *Channa orientalis* (Bloch and Schneider)	Chainga	1, 2, 3, 4, 6, 7, 9, 10, 12	125
70. *Channa punctatus* (Bloch)	Katra	1 to 7, 9 to 12	125
71. *Channa striatus* (Bloch) Order : Synbranchiformes Family : Synbranchidae Genus : *Monopterus* Lacepede, 1800	Sanwal	2, 3, 5, 7, 10, 11, 12	225-290
*72. *Monopterus cuchia* (Hamilton) Order : Perciformes Suborder : Percoidei Family : Centropomidae Genus : *chanda* Hamilton, 1822	Kalind	2, 3, 4, 6, 10, 12	310
73. *Chanda nama* (Hamilton)	—	2, 3, 7, 10, 12	32

*New records from M.P.

	Species	Local Name	Locality	Maximum Length (mm)
74.	*Chanda ranga* (Hamilton) Family : Nandidae Genus : *Nandus* Valenciennes, 1831	—	2, 3, 7, 10, 12	45
75.	*Nandus nandus* (Hamilton) Family : Badidae Genus : *Badis* Bleeker, 1853	—	2, 3, 5, 7, 12	52
76.	*Badis badis* (Hamilton) Suborder : Mugiloidei Family : Mugilidae Genus : *Rhinomugil* Gill, 1863	Kana	1, 5, 6, 8	40
77.	*Rhinomugil corsula* (Hamilton) Suborder : Gobioidei Family : Gobiidae Genus : *Glossogobius* Gill, 1859	Natera	2, 10	158
78.	*Glossogobius gutum* (Hamilton) Suborder : Ananbantoidei Family : Belontiidae Genus : *Colisa* Cuvier and Valenciennes, 1831	Patharchata	1 to 4, 6, 7, 9 to 12	105
79.	*Colisa fasciatus* (Bloch and Schneider) Suborder : Mastacembeloidei Family : Mastacembelidae Genus : *Mastacembelus* (Gronow's, 1763) Scopoli 1777	—	3, 5, 10, 11, 12	38
80.	*Mastacembelus armatus* (Lacepede)	Bami	1, 2, 3, 5 to 8, 10, 12	178-220
81.	*Mastacembelus pancalus* (Hamilton)	Godal	2, 3, 7, 9	142

Localities in the District :

1. River Tons upstream at Purwa
2. River Tons downstream Purwa upto Teonthar
3. River Bihar at Rajghat (Sangam)
4. River Bihar at Vikram bridge
5. River Bihar at Chachai (upstream of water falls)
6. River Bihar at Chachai (downstream of water falls)
7. River Bichia at Rewa
8. River Mahanadi at Raipur
9. River Mahanadi at Keoti (upstream of water falls)
10. River Mahanadi at Keoti (downstream of water falls)
11. Rani Talab.
12. Govindgarh Lake.

Acknowledgements

The author is grateful to Dr. S.B. Srivastava ,Prof. of Zoology, Government Model Science College, Rewa (Madhya Pradesh) for providing laboratory facilities, to Dr. S.K. Gupta, Department of Zoology, Pt. J.N. College, Banda (Uttar Pradesh) for critically going through the manuscript and to the authorities of Zoological Survey of India, Dehra Dun for identification of fishes and library facilities.

BIBLIOGRAPHY

Annandale, N.: VI. The fauna of certain small streams in the Bombay Presidency. *Rec. Indian. Mus.* **16** (1919), 109-161, pls. 1-VII.

Day, F.: The fishes of India; being a natural history of the fishes known to inhabit the seas and fresh waters of India, Burma and Ceylon. 778, pls. 198, London 1875-1878.

Dubey, G.P.: Madhya Pradesh Fisheries Bulletin No. 3, 1955.

Dubey, G.P. and Mehra, R.K.: Fish and Fisheries of Chambal river.
Proc. 1st *All India Congr. Zool.* (1959) (Pub. 1962), 647-665.

Dubey, G.P. and Tuli, R.P.: Breeding of major carps in Madhya Pradesh.
Indian Sci. Congr. IV (1959), 24.

Dubey, G.P. and Tuli, R.P.: Observations on the breeding of major carp in Madhya Pradesh. *J. Bombay nat. Hist. Soc.* **58** (1) (1961), 81-91.

Dubey, G.P. and Verma, M.N.: A preliminary study of the fish fauna of Madhya Pradesh. *The Vikram,* J. Vikram, Univ **8** (4) (1965); 1-8.

Greenwood, P.H., Rosen, D.E., Weitzman, S.H. and Myers, G.S: Phyletic studies of Teleostean fishes, with a Provisional classification of living forms.

Bull. Amer. Mus. Nat. Hist. N.Y. **131** (4) (1966), 339-456.

Hora, S.L.: Notes on the fishes in the Indian Museum. XXXVII. on a collection of fish from Bailadila range, Bastar state. Central Provinces.

Rec. Indian. Mus. **40** (1938), 231-241.

Hora, S.L.: On a collection of fish from the head waters of the Mahanadi river, Raipur District (C.P.) *Rec. Indian. Mus.* **42** (1940), 365-374.

Hora, S.L. and Nair, K.K.: Fishes of Satpura range, Hoshangabad district Central Provinces, *Rec. Indian, Mus.* **43** (1941), 361-373.

Karamchandani, S.J. and Mishra, D.N.: Observations on the growth rate of *Catla catla* (Hamilton) based on recovery of one tagged specimen from Kulgarhi reservoir, Madhya Pradesh.

J. Inland Fish. Soc. India **6** (1974), 88.

Khan, M.S.: Observations on the breeding of Indian Carps in the *Garua Nala* (Bhopal). *J. Bombay nat. Hist. Soc.* **56** (1) (1959), 144-146.

Malviya, R.B.: A list of fishes from Jabalpur, M.P. *Proc. Nat. Acad. Sci. India. Sec.* B, **31** (3) (1961), 349-354.

Mathur, D.S. and Mishra, S.K.: Addition to the fish fauna of Jabalpur district (M.P.). Newsl. Zool. Surv. India **2** (4) (1976), 156-158.

Mehra, R.K.: A preliminary fisheries survey of Nagda reservoir. *Proc. Indian Sci. Congr.* (Late abstracts) No. **14** (1959), 25.

Mukherjee, G.P. and Saxena, R.D. : Problems of fresh water fisheries in Madhya Pradesh. *Agra Univ. J. Res. (Sci)* **16** (1) (1967), 67-74.

Rao, V.V. and Sharma, H.S.: *Esomus danricus jabalpurensis* Subsp. Nov. from Pariat river near Jabalpur. *J. Bombay nat. Hist. Soc.* **69** (2) (1972), 434-436.

Rosen, D.E. and Patterson, C.: The structure and relationships of the paracanthopterygian fishes. *Bull. Amer. nat. Hist.*, **141** (1969) : 357-474.

Soni, D.D.: Fish fauna of Bhopal lower take. *Proc. 1st All India Congr. Zool*-(1959) (.Pub. 1962), 639-641.

Soni, D.D.: Fish fauna of Bhopal upper lake. *Proc. Indian Sci. Congr.* 47th Session III (1960), 477.

Swarup, H. : Fish fauna of Sagar lake. *Saugor Univ. J.* **1** (2) (1953), 239-244.

Tilak, R.: On a little known cyprinid, *Puntius carletoni* Fowler (Pisces: Cypriniformes). *Sci.* and *Cult.* **36** (1970), 613-614.

Tilak, R. and Sinha, N.K.: A check-list of Fishes from Madhya Pradesh (India). *Zool. Jb. Syst.* **106** (1979), 175-196.

Trevenen, W.D.: Fishing in the rivers of C.P. *J. Bombay nat. Hist. Soc.* **34** (1930), 700-715.

Tripathi, S.D.: Hypophysation of the Indian major carps at the experimental station, Adhartal lake, Jabalpur (Madhya Pradesh). *J. Inland Fish. Soc. India* **5** (1973), 171-181.

Tuli, R.P. and Mehra, R.K.: Collection of major carps, spawn fry and fingerlings in Gwalior Division. *Proc. Indian Sci. Congr.* III No. 121 (1960), 478.

Verma, M.N.: Hydrobiolgical study of a tropical impoundment. Tekanpur reservoir Gwalior Division, India with special reference to the breeding of Indian carps. *Hydrobiologia* **34** (1969), 358-368.

Martyrdom, But of A Different Class

By

Air Commodore R.S. Bishnoi, A.V.S.M. (Retd.)

There is a class of people who bleed so that others may remain safe. These are the soldiers who get killed in war to save others from dying. There are also the Samaritans as those in the 'Beauty Without Cruetly' (the international organisation with a dedicated India Branch at No. 4 Prince of Wales Drive, Pune 40), who sweat to extend their hand of friendship to the mute hapless animals. There are also the banefactors of the Red Cross and the Blue Cross, in whose ambits of munificence lie the suffering man and animal respectively. In the Western World, we have an organisation viz. Greenpeace, which works to enable the coming generations to live in a clean environment.

While these are some of the institutionalised avenues, and there are many more too, through which milk of human kindness flows, here is an authentic account of an individual's valour resulting in his death, while trying to save the life of an Indian Gazelle (*Gazella gazella bennetti*). This is the most recent event in the series of events, the like of which have taken place many times since Independence, though they did not get the shine of the publicity-media as much as they deserve.

It was the second day of the month of April 1988, and the day was a Saturday. To Shri Aayiidaan Ram (aged 60), Shri Baga, Shri Naina and Shri Gordhan, all of the agricultural Jat community, living in their *dhaanies* in village Urasar of the Dhori Manna Panchayat Samiti in district Barmer located in the south-western region of Rajasthan, this was just a usual day in their modest lives. These *dhaanies* cannot be called farm-houses for that would give the impression of those being rich residences, but these are huts, perhaps with thatched roofs, by the side of their fields to enable them to live there while safeguarding their crops and tending their cattle. Aayiidaan Ram and others there heard a gun-fire, which was not a usual occurrence, and they rushed in the direction from which the sound had come. They found that a group of poachers had unloaded their weapon against an antelope, the Indian Gazelle, or a *chinkara* in their own language. These gazelles are on the list of endangered species according to the Preservation of Wildlife Act, 1972, but fortunately in certain pockets in western Rajasthan, these animals abound, and unless a vigil had been kept by the local communities, they would have been extinct there too as elsewhere. The poachers finding that they were being chased took to their heels, and the saviours viz. Aayiidaan Ram and others took charge of the bleeding antelope who lay there.

They brought him to their *dhaani* and started rendering it first-aid. While Aayiidaan and another made themselves busy at this task, the rest proceeded to the police station to report as an offence under the said Act had been committed. The population in this part of the country being sparse, the police stations and the like are located far apart.

While the poachers in their first impulse had run away from the scene, they thought that the injured *chinkara* would constitute the most damaging peice of evidence against them. Hence they returned. At the time Shri Aayiidaan but for his one companion was alone, as the others had not come back from the police station. The poachers challenged the valiant Aayiidaan Ram so as to enable them to take away their booty which he resisted. They shot at him killing him on the spot. The *chinkara* too did not survive the injuries inflicted upon him earlier.

A meeting was organised by the All India Jeeva Raksha Sabha at the site of the martydom on May 1, 1988 to pay homage to the deceased, to express solidarity with the bereaved family and to convey their deep anguish at this unwarranted loss of human life. The meeting was thickly attended. Not only the residents of villages in the vicinity joined in, there came also people from village Gura Malani of district Jodhpur and of several villages of tehsil Saanchor of district Jalour, which took them three days of hard marching in the hot sun on the road. The All India Jeeva Raksha Bishnoi Sabha is an organisation dedicated to the cause of preserving Wildlife, which though bears a community's name, is thoroughly secular in its outlook. In fact Shri Aayiidaan Ram did not belong to the Bishnoi community. The Jeeva Raksha Bishnoi Sabha and the Bishnoi Samaj Seva Samiti of Sonri (a village in district Barmer) contributed a sum of rupees eleven hundred and one thousand respectively towards the welfare of the family of the deceased. The Sabha has also promissed to have a statue of the martyr installed at the hallowed spot. The Jat Trust Barmer gave another rupees one thousand for the welfare of Shri Aayiidaan's family.

Will this total sum of rupees three thousand and one hundred be enough to serve the needs of a family who has lost their bread-winner ? Obiviously no. This then brings us to the important question as to what is the Government's duty in such cases. Saving the endangered species is the aim of the Preservation of Wildlife Act 1972. It is also conceded that no Government can afford to post a police-man or a forest-guard with each and every herd of animals, to save them from poachers. Evidently this duty falls on dedicated citizens, who due to their love for animals, or due to their conviction in 'live and let live' go to risk their lives in performing this lawful act. What should the state do in return to acknowledge their debt to the martyr and to alleviate the sufferings of the bereaved family ? The answer is simple. The family should be granted a pension and an

eligible member of the family offered a job in the forest or the wildlife department. The concept is not at all new. Pension is given to the freedom fighters, and a dependent member of the deceased's family of a government servant dying in harness is offered a government job.

Through the medium of these columns, here is an appeal to the Government of Rajasthan to make a begining from this case and also take a policy-decision in the matter. Other State Governments would also do well to take policy-decisions in this matter, as that would set as a sub-conscious promoter of the cause on Wildlife in their respective States. There is also a request to the forest Wildlife institutions like the Forest Reaserch Institute and Wildlife Institute of India, the conscience keepers of the nation in such matters to add their weight in impressing upon the Government to take this timely decision.

———

Behaviour and Breeding Biology of Pied Myhna (*Sturnus contra contra*) and Common Myhna (*Acridotheres tristis tristis*)

By

J.H. Desai* and A.K. Malhotra**

Introduction

Four species of Myhnas viz. common, Bank, Pied and Brahminy are very commonly found in parks and gardens. General information about breeding season, nesting site, etc. etc. is available with respect to these species (Ali 1968, Ali and Ripley 1972, Baker 1926, Whistler 1919, 1963). The authors have attempted to study these species in detail so as to add to the information already available.

Material and Method

For the study of nidification and behaviour, nesting birds were observed with naked eyes and through a 7 × 50 prismatic field binocular. Observation of the nests were made during the early morning, forenoon, midday and late afternoon on successive days. The nest construction activities of birds were watched from a safe distance in a hide. The various dimensions and other observations were made by climbing the trees. The incubation period was studied by dating the eggs with Indian ink. Measurements of eggs and young were taken with a calliper and weight by analytical balance.

Observation

Breeding season

The breeding season of Pied and Common Myhna starts from March and continues upto July at the National Zoological Park. The birds select the nesting site of trees, hole of buildings, electricity poles etc. Generally a forked branch of the tree is selected for the construction of nests.

In two cases we observed that the nests were started by the pied myhna and when more than half of the nests were completed, these were taken over by common myhna where they laid eggs and hatched the young.

Nests

The nests of myhna are built at varying height from 5 metres to 15 metres in the fork of trees or holes in building. In pied myhna the nest is dome shaped with one entrance/

* Director and ** Biological Assistant at National Zoological Park, New Delhi (India).

gate measuring 6 cm in diameter were as the nest of common myhna is open, cup shaped measuring 11-13 cm in diameter. In most of the cases in pied Myhna the entrance has been found to face for the sky. The material used in both the cases was dry grasses, feathers, rags and threads etc. In both the species the nest is build by both the partners and take 9 to 20 days to complete.

Egg laying pattern

In both the species successive eggs were laid after a gap of 24 hours (Table 1). Majority of the eggs were laid in the forenoon while fewer in the noon and late afternoon.

Table 1

Egg laying pattern in pied and common Myhna

	lst egg laid on	2nd laid on	3rd laid on	4th laid on	5th laid on	6th laid on
Pied Myhna	31.5.82	1.6.82	2.6.82	3.6.82	—	—
	28.5.82	29.5.82	30.5.82	1.6.82	2.6.82	—
	23.6.82	24.6.82	25.6.82	26.6.82	27.6.82	28.6.82
Common Myhna	23.5.82	24.5.82	25.5.82	26.5.82	27.5.82	—
	1.6.82	2.6.82	3.6.82	4.6.82	—	—
	1.6.82	2.6.82	3.6.82	4.6.82	5.6.82	—

Clutch Size

The clutch size of 6 nests of Pied Myhna comprised of 3 to 6 eggs, whereas that of common Myhnas consisted of 4 to 6 eggs in 5 nests.

Egg

The eggs were oval in shape and bluish green in colour in both the species. However, the eggs of Common Myhna were bigger in size than Pied Myhna. 15 eggs of Pied and 23 of Common Myhna were weighed and measured. The average weight was 5.22 gram (range 4.80 to 5.75) Size 2.73 $\times$ 2.01 cm (range 2.4 to 3.00 $\times$ 1.9 to 2.1 cm) in case of pied myhna while that of common myhna the average weight was 6.27 gram (range 5 to 6.50 gram) and size 2.87 $\times$ 2.15 cm (range 2.8 to 3.1 $\times$ 2.0 to 2.3 cm).

Incubation

In this two species, both the parents incubated the eggs. However, the period of incubation shared between the sexes could not be ascertained because sexes are identical.

Period of Incubation

Incubation period was calculated as the time elapsed between the date of laying and date of hatching. In pied myhna 10 eggs were marked to determine incubation period of which 8 hatched out successfully (Table 2) after an average of 16.3 days (range 15 to 19 days).

On the other hand 10 eggs were marked to determine the incubation period of common myhna out of which 7 hatched out successfully with an average of incubation period of 14.2 days with (range 13 to 15 days) (Table 2).

Table 2

Incubation period of Pied and Common Myhna

Pied Myhna			Common Myhna		
Date of laying	Date of hatching	Incubation period	Date of laying	Date of hatching	Incubation period
31.5.82	15.6.82	15	23.5.82	7.6.82	15
1.6.82	20.6.82	19	24.5.82	8.6.82	15
2.6.82	20.6.82	18	25.5.82	8.6.82	14
3.6.82	lost	—	26.5.82	8.6.82	13
28.5.82	13.6.82	16	27.5.82	lost	—
29.5.82	14.6.82	16	1.6.82	15.6.82	14
30.5.82	14.6.82	15	2.6.82	lost	—
23.6.82	9.6.82	16	3.6.82	16.6.82	14
24.6.82	10.6.82	16	4.6.82	17.6.82	14
25.6.82	lost				

Hatching and reproductive success

The hatching success for Pied and Common Myhna was 63.7% and 74.7% respectively in 1982. However the overall reproductive success was 36.3% and 39.1% in pied and common myhna (Table 3).

The low reproductive success in myhnas is due to the heavy predation by crows, infertility of eggs and inadequate food supply by the parents to the chick.

Table 3

Hatching and Reproductive success of Pied and Common Myhna during 1982 at N.Z.P.

	No. of nest	Total eggs	Eggs lost to predator	Inter-tile	No. of hatch-hed cut	% of hatching	Chick lost to predation starvation	% of Repro-ductive success
Pied Myhna	5	22	1	7	14	63.7	6	36.3
Common Myhna	5	23	1	5	17	74.7	8	39.1

Nestling life

Remarks

Age in days	
0-5	The newly hatched Chicks were fleshy, pink in colour and generally naked. The gape was yellow and the eyes were closed. In few cases traces of filoplumes on dorsal side of the chicks was observed. They were unable to stand but were able to raise their necks and open mouths to receive food. The average birth weight was 4.80 gram of 5 chicks in pied myhna while in common myhna the average birth weight of 5 chicks was 5.70 gm. The bill, middle toe and tarsus measured 5 mm, 5 mm and 6 mm in pied myhna and 5.5 mm, 5.5 mm and 6 mm in common myhna respectively.
6-10	In both the species chicks gained weight about six times during the period. Eyes opened at the age of 6-8 days in both the cases. Chicks were still unable to stand. The ventral side became dark in colour. Primary and secondary quill feathers grew up. Dark filoplumes were seen in the dorsal side.
11-15	The chicks gained weight. The primary and secondary feathers measured 16 mm and 14 mm in pied myhna and 22 mm and 20 mm in common myhna. Unable to stand on toe. Rectrices made appearance. Head covered with black feathers.
15-20	At this age, in pied myhna, the dorsal side was covered with black and white feathers. Ventral side had white feathers on the sides except in the midline. Tail with vaxillum grew out. Able to run on ground and flap wings. Middle Toe, Bill and tarsus growing uniformaly Fig-2 & 3 in both the species. The chicks of common myhna were almost covered with black feathers on dorsal side. Ventral side was without feathers. Legs become yellow, toe dark brown. Able to perch. Tail prominent. Primary with white feathers observed. Cries frequently when disturbed.
21-25	The chicks left their nests at the age of 21 to 26 days. They were covered with black and white feathers all over the body. Depends upon parents for food.

Table 4

Morphological and motor development of nestling of pied and common myhna

Development of flight feathers	Commonly seen at age (days)	
	Pied myhna	Common myhna
Quill feathers over the body	3	4
Primaries	3	3
Secondary	3	3
Rectries	7	8
Vaxillum on primary and secondary	10-12	10-12
Eyes open	6-8	6-8
Wing flaping	15-16	15-16
Leaving the nest	22-26	21-25

General Behaviour

It has been observed that common myhna is more aggressive than the pied. Both have strong recognition power. As and when the nest was examined by climbing, the myhnas cried loudly and tried to attack the observer (specially common myhna). Their aggressiveness was more profound when the nest had chicks. When the young were about to leave the nest, they spent most of the time in the tree. During that period parents made frequent trips to feed them. After this the chicks followed their parents for feeding.

Discussion

Narang, Tyagi and Lamba (1980) described the breeding season of pied myhna from late Feb. to August at Dehra Dun while Ali (1968) described it from March to September in Pied Myhna and April to August in Common Myhna. At National Zoo, myhnas breed from March to July. According to Ali and Ripley (1972) the incubation period in common myhna is 17 to 18 (Lamba) and 13-14 days (Sen Gugta) while the incubation period of pied myhna is undetermined. Narang, Tyagi and Lamba (1980) calculated 14-15 days as incubation period of pied myhna at Dehra Dun. According to our observation the incubation period for pied myhna is from 15 to 19 days with an average of 16.3 days and for common myhna it is from 13 to 15 days within average of 14.2 days. We found the average weight and measurement of eggs of pied myhna as 5.22 gm and 2.73 × 2.01 cm while those of common myhna weighed 6.27 gm and 2.87 × 2.15 cm. According to Narang etc. (1980) the hatching suceess was 79% and 88% in 1975 and 1976 respectively. The freshly hatched young weighed 5.12 gm, and the young leave the nest after

3 weeks of age in case of pied myhna. At National Zoological Park the hatching success for 1982 was 63.7% and 74.7% for pied and common myhna respectively and the overall reproductive success in these species was 36.3% and 39.13%. Further the newly hatched young weighed 5.22 gm in pied myhna and 6.22 gm in common myhna. The young of both the species left the nest at the age of 21-26 days at National Zoological Park.

References

Ali, S.1968. The Book of Indian Birds, Bombay Nat. Hist. Society.

Ali, S & Ripley, D.S. 1972. Hand book of the birds of India and Pakistan, Vol.5, pp. 172–180, Oxford University Press Bombay, London, New York.

Baker, E.C.S.1926. The fauna of British India, Vol.III. Taylor and Francis, London.

Narang, N.L., Tyagi, A.K. & Lamba, B.S. 1980. A contribution to the ecology of Indian Pied Myhna, *Sturnus contra contra* Linnaeus, J. Bom. Nat. His. Soc. Vol., 75, pp. 1157–77.

Whistler, H. 1919. Some birds of Ludhiana Dist., Punjab. Journal Bom. Nat. His. Soc. 26, 585-600.

Whistler, H. 1963. Popular hand book of Indian birds. 4th Ed. Oliver & Boya, London.

———

Uttar Pradesh's
GRAND ATTRACTION

For Lovers of Wild Life
CORBETT NATIONAL PARK
DUDWA NATIONAL PARK
VALLEY OF FLOWERS NATIONAL PARK

CORBETT NATONAL PARK is famous all over the world for its scenic grandeur and its wildlife—elephants, tigers, deer (several species) and a host of other mammals, birds and reptiles—the Ghariyal and magar and the mighty "Mahasheer fish".

DUDWA NATIONAL PARK is famous for its biggest surviving herd of 2600 swamp deer besides Tiger, Spotted deer, Sambhar, Hogdeer, Barking deer, Sloth bear, Wild boar, Marsh Crocodile and hundreds of innumerable birds. It is also now a home of Great Indian One Horned Rhinoceros introduced recently.

VALLEY OF FLOWERS NATIONAL PARK is an alpine valley nestling in shadow of snow peaks full of lush vegetation during monsoon. The valley remains in bloom for three months. The important vegetation consists of Rhodendrons, Primulas, Potentillas, Saxifrages, Marigold etc.

For further information please contact:—

(1) Addl. Chief Conservator of Forests (Wildlife)
17, Rana Pratap Marg, Lucknow (U.P.)
Phone No. 46140

(2) Field Director Project Tiger
Corbett National Park
Ramnagar (Nainital), U.P.
Phone No. 189

(3) Director
Dudwa National Park
Lakhimpur Kheri, U.P.
Phone No. 2560

(4) Dy. Conservator of Forests
Nanda Devi National Park
Chamoli, U.P.
Phone No. 79

FORM IV

(See Rule 8)

1.	Place of Publication	...	7, Astley Hall, Dehra Dun
2.	Periodicity of its Publication	...	Quarterly
3.	Printer's Name	...	Shri T.C. Sharma
	Nationality	...	Indian
	Address	...	Dun Printing House, 27, Rajpur Road, Dehra Dun
4.	Publisher's Name	...	Dr. R.N. Misra
	Nationality	...	Indian
	Address	...	Wildlife Preservation Society of India,
5.	Editor's Name	...	Dr. R.N. Misra
	Nationality	...	Indian
	Address	...	7, Astley Hall, Dehra Dun
6.	Name of the Printing Press and the true and precise description of the premises.	...	Dun Printing House, 27, Rajpur Road, Dehra Dun
7.	Names and addresses of individuals who own the newspaper and partners or shareholders holding more than one per cent of the total capital.	...	The Wildife Preservation Society of India, 7. Astley Hall, Dehra Dun

I, Dr. R.N. Misra, hereby declare that the particulars given above are true and correct to the best of my knowledge and belief.

Sd./- R.N. Misra

Publisher

President:— Col. Pratap Singh Malvendra of Nabha

Head Office :

Hony. Secretary:—Dr. R.N. Misra
Treasurer:—Dr. S. K. Sangal
Hony. Asstt. Secretary:—Shri N.K. Gaur

Delhi Branch
President:—Shri K.P. Sinhdeo

Vice President:—Shri S.K. Roy

Editorial Board

(1) Shri N.D. Bachkheti
I.G. Forests (Retd.)
7, Astley Hall, Dehra Dun

(2) M.A. Rashid
103, Ketan Apartment
Fatehganj Camp
Vadodara—390002
(Gujarat)

Vice Presidents

1. Dr. R.N. Misra 2. Dr. S.K. Sangal 3. Shri N.K. Jain

Buy from the Hony. Secretary, Wildlife Preservation Society of India 7, Astley Hall, Dehra Dun.

		Price
(1)	Society's Badge—Metal Cheetal Head	... Rs. 6.00 each
(2)	'National Parks' by K.S. Sankhala, IFS (Published by WLPSI)	... 20.00 ,,
(3)	CHEETAL—IUCN Special Souvenir Issue, 1969	... 20 00 ,,
(4)	,, ,, ,, ,, ,, 1972	... 15.00 ,,
(5)	Back Numbers of Cheetal (if available)	... 12.00 ,,

Edited by Dr. R.N. Misra, Dr. S.K. Sangal, N.K. Jain and Published by Dr. R.N. Misra, Hony. Secretary, Wildlife Preservation Society of India (Phone: 25392), 7, Astley Hall, Dehra Dun and Printed by M.K. Sharma at Dun Printing House, Rajpur Road, Dehra Dun.

To live. Let live.

Look after the trees . . . and the earth will be able to breathe freely for generations to come.

This is the credo ONGC believes in firmly.

A commitment to conservation that is best illustrated by the fact that for every tree cut down by ONGC at least ten new ones are planted.

Aside from burning out oil slicks, chemically treating sea water and keeping the air free of pollution.

Proving themselves to be not only the energy-givers to the nation but also the preserver of a legacy future generations will be proud of.

A green and verdant land called India.

ONGC

Oil & Natural Gas Commission
Tel Bhavan, Dehra Dun

Enriching the quality of life and its environment.

Contour-D-ONGC-1629/87